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World Geography Through Maps

For UPSC, State PCS and Other Competitive Exams

Manjunath Thamminidi

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PMF IAS® World Geography Through Maps First Edition

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Publisher: PMF IAS / Pathfinder Merit Fleet LLP, #160 Butaldinni Depo, Sindhnur, Raichur – 584128, Karnataka, India
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PMF IAS® World Geography Through Maps First Edition
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Contributors: Arun Kumar M and Pratik Sudhakar Jadhav
Designer and Publisher: PMF IAS® / Pathfinder Merit Fleet LLP
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Manjunath Thamminidi is an educator, author, and founder of PMF IAS. His contributions have made quality education for UPSC Aspirants more accessible and affordable.

Manjunath Thamminidi is renowned for his lucid and visually engaging books on Environment and Geography, which have become popular among civil services aspirants. These publications are praised for their clarity, comprehensive coverage, and effective use of illustrations, aiding aspirants in understanding complex topics. They have significantly impacted the preparation strategies of many UPSC aspirants and helped churn out countless UPSC Toppers.

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PREFACE

World Geography has always been a low-hanging fruit for the UPSC Civil Services, State Civil Services and other similar competitive exams.

- **Direct Questions in Prelims:** Topics based on the location of continents, countries, cities, oceans, rivers and world map-based questions (e.g., straits, seas, and mountains) have been frequently asked. Example: Identify the correct location of the Strait of Hormuz or countries bordering the Caspian Sea.
- **Current Affairs Linkage:** Questions are framed based on Natural disasters (e.g., the 2025 Myanmar Earthquake), geopolitical events and hotspots (e.g., the Suez Canal blockage), and other issues from a geographical angle.

You need general awareness, map-reading skills, and knowledge of current affairs and contemporary issues to answer such questions. This is exactly where the "PMF IAS World Geography Through Maps" comes into play. It blends general knowledge with current affairs and previous year questions (PYQs) to give you absolute clarity on the path you need to take to score better in the exam.

Happy learning, and best wishes for your exam preparation!

- Manjunath Thamminidi

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1. Asia

Area	• 44.58 million km^2 (30% of the Earth's land area)
Countries	• 49 fully recognised countries + **Palestine (partially recognised)** **Largest Countries (by area)**: 1. Russia 2. China 3. India 4. Kazakhstan 5. Saudi Arabia **Largest Countries (by population)**: 1. India 2. China 3. Indonesia 4. Pakistan 5. Bangladesh
Latitude and Longitude Extent	• **Latitude:** 10°S to 80°N • **Longitude:** 25°E to 170°W
Coastline	• 62,800 km
Major Islands/Island groups	• **Greater Sunda Islands (Borneo, Sumatra, Java and Sulawesi)** • **Lesser Sunda Islands (Bali, Lombok, Sumbawa, Sumba, Timor, etc.)** • **Maluku Islands of Indonesia (Moluccas)** • **Japan (Honshu, Hokkaido, Kyushu and Shikoku)** • **Philippines (Luzon, Visayas and Mindanao)** • **Kuril Islands (Russia)** • **Ryukyu Islands (Japan)** • Taiwan • **Sakhalin (Russia)** • **Cyprus (geographically part of Asia and not Europe)** • **Disputed Islands:** ✓ **Paracel Islands**, ✓ **Spratly Islands** and ✓ **Senkaku (Diaoyu Dao or Diaoyu)** islands (**Japan** controls the islands and calls them **Senkaku**; **China** and **Taiwan** claim the islands and call them **Diaoyu**).
Major Lakes	1. **Caspian Sea (the largest lake in the world)** 2. **Lake Baikal (deepest lake in the world; largest freshwater lake by volume)** 3. **Lake Balkhash**
Highest Peaks	1. **Mt. Everest** (8,848 m) (Nepal-China border) 2. K2 (8,611 m) (India; located in PoK) 3. Kangchenjunga (8,586 m) (India-Nepal border)

Longest Rivers	1. **Yangtze River (6,300 km)** 2. **Yellow River (5,464 km)** 3. **Mekong (4,909)** 4. **Lena River (4,294 km)**
Landlocked Countries	• **12:** Armenia, Bhutan, Laos, Nepal, Mongolia, Afghanistan, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and **Uzbekistan**.
Double Land-locked Countries	• **Uzbekistan** ✓ Other landlocked countries surround a double landlocked country. ✓ **Liechtenstein** (Europe) is the world's only other double landlocked country.
Facts	1. **Largest City:** Tokyo 2. **Largest Country:** Russia (by area); Largest globally also. 3. **Smallest Country:** Maldives (by both area and population) 4. **Highest and Lowest Points:** Mt. Everest and the **Dead Sea**

[UPSC 2006] Other than India and China, which one of the following groups of countries border Myanmar?

a) Bangladesh, Thailand and Vietnam
b) Cambodia, Laos and Malaysia
c) Thailand, Vietnam and Malaysia
d) Thailand, Laos and Bangladesh

Answer: d) Thailand, Laos and Bangladesh

[UPSC 2005] Which one of the following is the correct sequence of the given towns of Pakistan while moving from the north towards the south?

a) Islamabad–Gujranwala–Peshawar–Multan
b) Peshawar–Gujranwala–Multan–Islamabad
c) Peshawar–Islamabad–Gujranwala–Multan
d) Islamabad–Multan–Peshawar–Gujranwala

Answer: c) Peshawar–Islamabad–Gujranwala–Multan

1.1. Major Rivers of Asia

1.1.1. Yangtze River

- It is the **longest river in Asia** (~6,300 km) and the **third longest river in the world** (1st – Nile; 2nd – Amazon). It is known as the **Yanugzi or Chang Jiange** and is a **granary of China**.
- **Upper Reaches:** Plateau of Tibet, marine sedimentary, igneous, and metamorphic rocks
- **Middle Reaches:** Deeply eroded **mountain plateaus**, Paleozoic and Mesozoic rocks
- **Lower Reaches:** Basin fills of Cenozoic material.

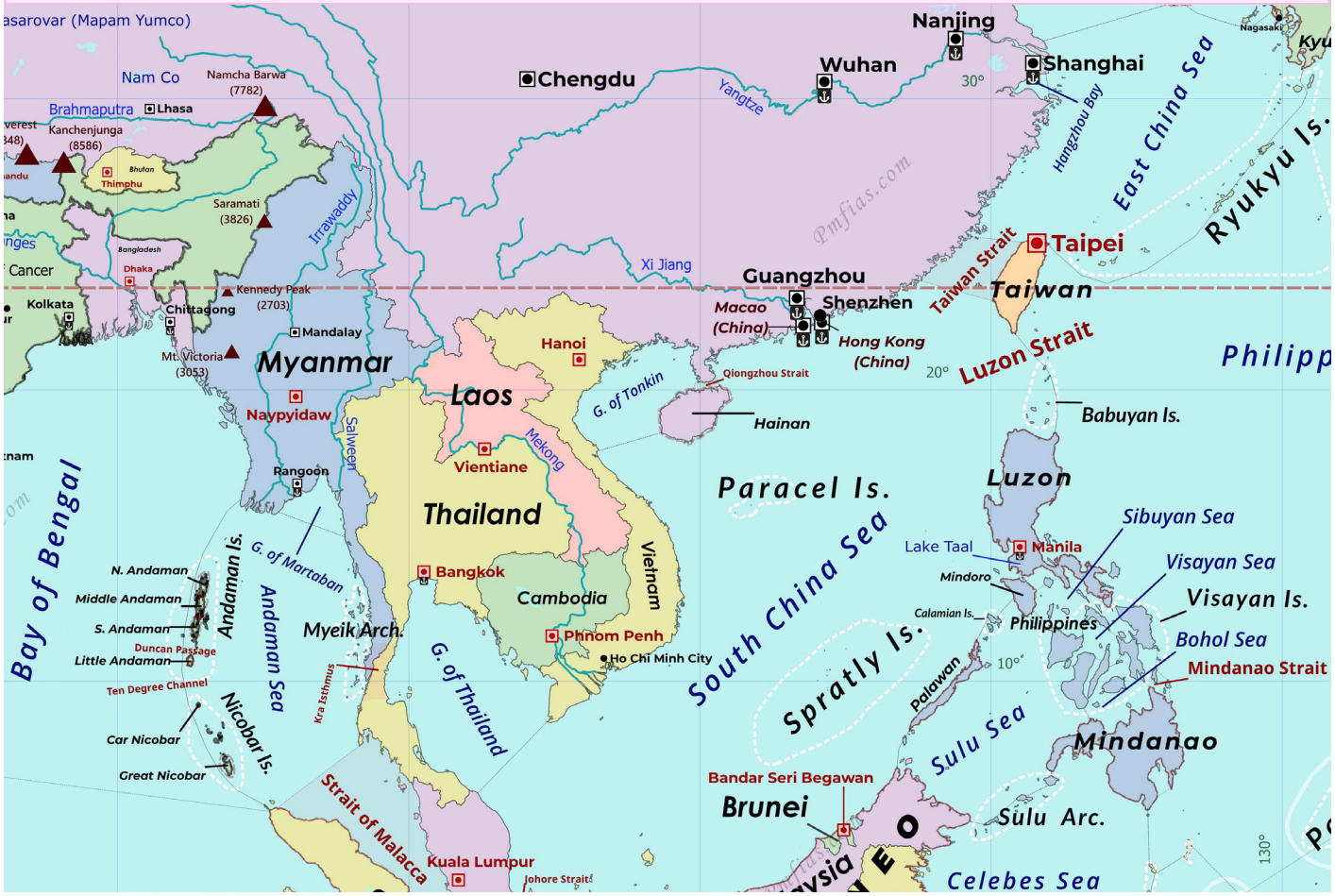
Yellow Sea and the Rivers

Source	• Tanggula Mountains, Tibet.
Mouth	• Yangtze Delta, **East China Sea**.
Drainage Basin Countries	• China
Main Tributaries	• Yalong, Min, Huangpu and **Wu** rivers.
Important Cities	• **Shanghai** and **Wuhan**.
Important Dams/Reservoirs	• **Three Gorges Dam**

[UPSC 2006] Huangpu River flows through which one of the following cities?

a) Beijing
b) Ho Chi Minh City
c) Shanghai
d) Manila

Answer: c) Shanghai



1.1.2. Yellow River

- Yellow River or Huang He (~5,400 km) is the birthplace of ancient Chinese civilisation and is referred to as the '**Mother River**'. It is the **second-longest river in China and Asia**.

Source	• Bayan Har Mountains, **Qinghai Province** (northwestern China).
Mouth	• **Bohai Sea**.
Drainage Basin Countries	• China
Main Tributaries	• Wei, Qin, etc.
Important Cities	• Lanzhou, **Xi'an**, **Zhengzhou**.
Important Dams/Reservoirs	• Longyangxia Dam and Liujiaxia Dam

Bo Hai Sea (Bohai Sea)

- The **Bohai Sea** is a **marginal sea**, the **northwestern extension of the Yellow Sea**. It is connected to the Yellow Sea via the **Bohai Strait**. In 2021, India urged China to aid 39 crew members of cargo vessels stranded for months in a port on the Bohai Sea.

1.1.3. Mekong River

- It is the **longest river (~4,900 km) in Southeast Asia** and is a **transboundary river**. The **Upper Mekong River Basin** comprises the Tibetan Plateau, the Three Rivers Area, and the Lancang Basin in China and Myanmar. The **Lower Mekong River Basin** comprises the Northern Highlands, the **Khorat Plateau**, the Tonle Sap Basin, and the Mekong Delta.

Source	• Tanggula Mountains, **Qinghai Province** (northwestern China).
Mouth	• **Mekong Delta**, Vietnam, **South China Sea**.
Drainage Basin Countries	• China, Myanmar, Laos, Thailand, Cambodia and Vietnam.

Main Tributaries	• Nam Ta, Nam Ou, Se Kong.
Important Cities	• **Vientiane** (Laos), **Phnom Penh** (Cambodia), **Ho Chi Minh City** (Vietnam).
Important Dams/Reservoirs	• Xayaburi Dam (Laos), Lower Sesan 2 Dam (Cambodia), Nuozhadu Dam (China)

[UPSC 2020] Consider the following pairs:

River	***Flows into***
1. Mekong -	Andaman Sea
2. Thames -	Irish Sea
3. Volga -	Caspian Sea
4. Zambezi -	Indian Ocean

Which of the pairs given above is/are correctly matched?

a) 1 and 2 only
b) 3 only
c) 3 and 4 only
d) 1, 2 and 4 only

Explanation

- The Mekong River drains into the **South China Sea**.
- The Thames River drains into the **North Sea**.
- The Volga River's mouth is a vast delta located in the **Caspian Depression**, where the river branches into hundreds of distributaries and empties into the **Caspian Sea**.
- The mouth of the Zambezi River is located in Mozambique, where it forms a large delta and empties into the **Mozambique Channel of the Indian Ocean**.

Answer: c) 3 and 4 only

[UPSC 2004] The great Asian river, the Mekong, does not run through:

a) China
b) Malaysia
c) Cambodia
d) Laos

Answer: b) Malaysia

1.1.4. Lena River

- It is the **longest river (~4,400 km) in Russia** and flows **northward** across the vast **Siberian Plains**. It is divided into three segments consisting of the upper section, extending from its source to the **Vitim River**

tributary; the middle course stretching from the Vitim to the point where the **Aldan River** meets the Lena, and finally, the lower section from the confluence with the Aldan to its mouth at the **Laptev Sea**.

Source	• **Baikal Range** (near Baikal Lake)
Mouth	• **Lena Delta**, Laptev Sea, **Arctic Ocean**.
Drainage Basin Countries	• Russia
Main Tributaries	• Aldan, Vilyuy, and Olyokma Rivers.
Important Cities	• Yakutsk and **Lensk**.

1.1.5. Ob River

- The Ob River (~2,270 km) is the **westernmost of the three great Siberian rivers**, along with the **Yenisei** and the **Lena** and flows **northward** across the **West Siberian Plain**.
- The Ob River basin is rich in natural resources, including oil, natural gas, coal, and timber.

Source	• Katun River (formed by the confluence of the Biya and Katun rivers), **Altai Mountains**, Russia.
Mouth	• Gulf of Ob, **Kara Sea**, **Arctic Ocean**.
Drainage Basin Countries	• Russia, Kazakhstan, China, Mongolia
Main Tributaries	• **Irtysh**, **Tobol**, etc.
Important Cities	• Novosibirsk and Surgut.
Important Dams/Reservoirs	• **Novosibirsk Reservoir**, Krasnoyarsk Reservoir (on the Yenisei River)

1.1.6. Tigris-Euphrates River System

- The Tigris-Euphrates River system is a great river system in southwestern Asia. It comprises the Tigris and Euphrates rivers, which follow roughly **parallel courses** through the heart of the Middle East.

- The two rivers originate within 80 km of each other in **eastern Turkey** and travel southeast through northern **Syria** and **Iraq** to the head of the **Persian Gulf**.
- The headwaters of the Euphrates are the **Murat** and **Karasu** rivers in the **Armenian Highland** of northeastern Turkey. The Euphrates forms at **Keban (Turkey)**, where the Keban Dam spans a deep gorge.
- The Tigris, rising in **Lake Hazar in Turkey**, drains a wide area of eastern Turkey. After forming the **border** between **Turkey** and **Syria**. The Tigris reaches the alluvial plain near **Samarra**.
- At **Al-Qurnah (Iraq)**, the Tigris joins the Euphrates to form the **Shatt al-Arab**, which **flows into the Persian Gulf**.
- The lower portion of the region that the rivers define, known as **Mesopotamia**, was one of the **cradles of civilisation**.

[UPSC 1997] Consider the map given below:

The river shown on the map is:

a) Irrawaddy
b) Mekong
c) Chao Phraya
d) Salween

Explanation

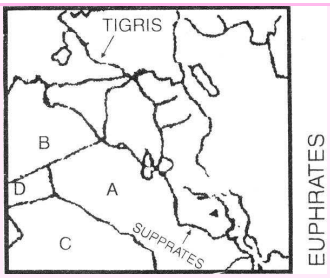
- The Salween River is the **longest in Myanmar**.
- **Source: T'ang-ku-la Mountains** of eastern Tibet.
- It flows southward for approximately 2,400 km through China's Yunnan province and eastern Myanmar.
- **Mouth: Gulf of Martaban** in the **Andaman Sea** near Moulmein.

Answer: d) Salween

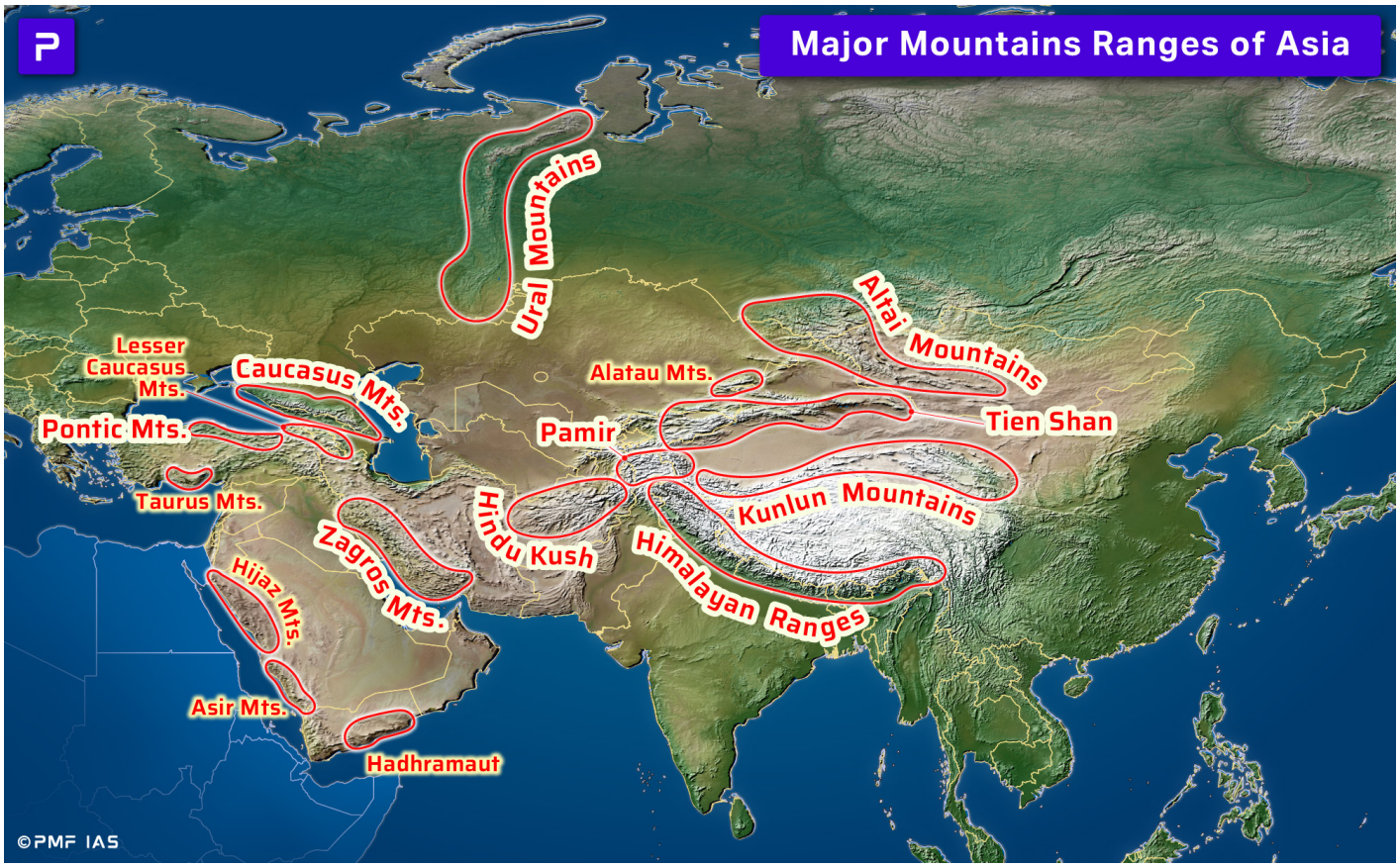
[UPSC 1996] The rough outline map shows a portion of the Middle East. The countries labelled A, B, C and D are respectively:

a) Syria, Iraq, Jordan and Saudi Arabia
b) Syria, Iraq, Saudi Arabia and Jordan
c) Iraq, Syria, Saudi Arabia and Jordan
d) Iraq, Syria, Jordan and Saudi Arabia

Answer: c) Iraq, Syria, Saudi Arabia and Jordan



1.2. Major Mountain Ranges of Asia



1.2.1. Himalayas

- The Himalayas extend for about 2,500 km, separating the Indian subcontinent from the rest of Asia. It passes through **India**, **Pakistan**, **China**, **Nepal**, and **Bhutan**.
- **Highest Peak:** **Mount Everest (8,849 m)**
- **Major Passes:** **Khunjerab Pass** (Connecting Pakistan and China), **Zoji La** (Connecting Kashmir and Ladakh), **Nathu La** (Connecting Sikkim and China), **Rohtang Pass** (Connecting Kullu and Lahaul).
- **Major Glaciers:** **Siachen Glacier**, Gangotri Glacier, Baltoro Glacier, and **Biafo** Glacier. (**Siachen Glacier is the second-longest glacier in the world's non-polar areas** after the **Fedchenko Glacier**, located in the **Pamir Mountains of Tajikistan**. **Lambert Glacier** in East Antarctica is the world's longest glacier.)

1.2.2. Tien Shan

- It stretches for about 2,400 km, straddling the border between **Kyrgyzstan** and **China**. It means "**Celestial Mountains**" in Chinese. It was formed due to the collision between the **Eurasian** and Indian tectonic plates and is mainly composed of crystalline and sedimentary rocks of the Palaeozoic Era.
- **Highest Peak:** **Victory Peak (7,439 m)**
- **Major Passes:** Torugart Pass and Bedel Pass.
- **Major Glaciers:** Inylchek Glacier, **Semenov Glacier**, Mushketov Glacier.

1.2.3. Ural Mountains

- It is one of the world's oldest mountains and runs for approximately 2,500 km (in an indirect **north-south** line from Russia to Kazakhstan. It forms a natural divide between Europe and Asia.
- It is rich in numerous **natural resources**, including coal, metal ore, and precious stones.
- **Highest Peak:** Mount Narodnaya (1,895 m)

1.2.4. Kunlun Mountains

- The Kunlun Mountains are a mountain system in **southern Central Asia**, extending **west to east** for around 2,000 km from the **Pamirs in Tajikistan** to the **Kunlun Pass** and adjacent ranges in central Qinghai province, China.
- The Kunlun represents a region of recent crustal movements and seismic activity, particularly associated with the **Altun strike-slip fault system**.
- **Highest Peak:** **Mount Muztag** (7,723 meters) in the Arkatag Mountains.

1.2.5. Pamir Mountains

- The Pamir Mountains are located in Central Asia, primarily in **Tajikistan** and extending into Afghanistan, China, and Kyrgyzstan. They are one of several regional mountain ranges, adjacent to the Hindu Kush, Karakoram Range, Kunlun Mountains, and Tien Shan.
- **Highest Peak:** Imeni Ismail Samani Peak (7,500 m)

1.2.6. Altai Mountains

- The range is located in central Asia in a **southeast-northwest direction** and spread across China, Mongolia, Russia, and **Kazakhstan**. It is divided into Altai proper, Mongolian Altai, and Gobi Altai. It was formed during orogenic upthrusts 500-300 million years ago and was shaped by Quaternary glaciation and river erosion. It provides the **source** for the **Ob** and **Irtysh Rivers**.
- **Highest Peak:** Belukha (4,506 m) in Altai proper.

1.2.7. Hindu Kush

- It is located in **central and South Asia** and runs northeast to southwest for 800 km. It stretches from eastern Afghanistan, northwestern Pakistan, and southeastern Tajikistan and is part of the western section of the **Hindu Kush Himalayan Region (HKH)**.

- It is known for its **access routes for invaders** in the past, E.g., Alexander, Genghis Khan, Timur, etc., and they were strategically crucial during British rule in India.
- **Highest Peak:** **Mount Tirich Mir** (~7,690 m), near the Pakistan-Afghanistan Border.

1.2.8. Hindu Kush Himalayan Region (HKH)

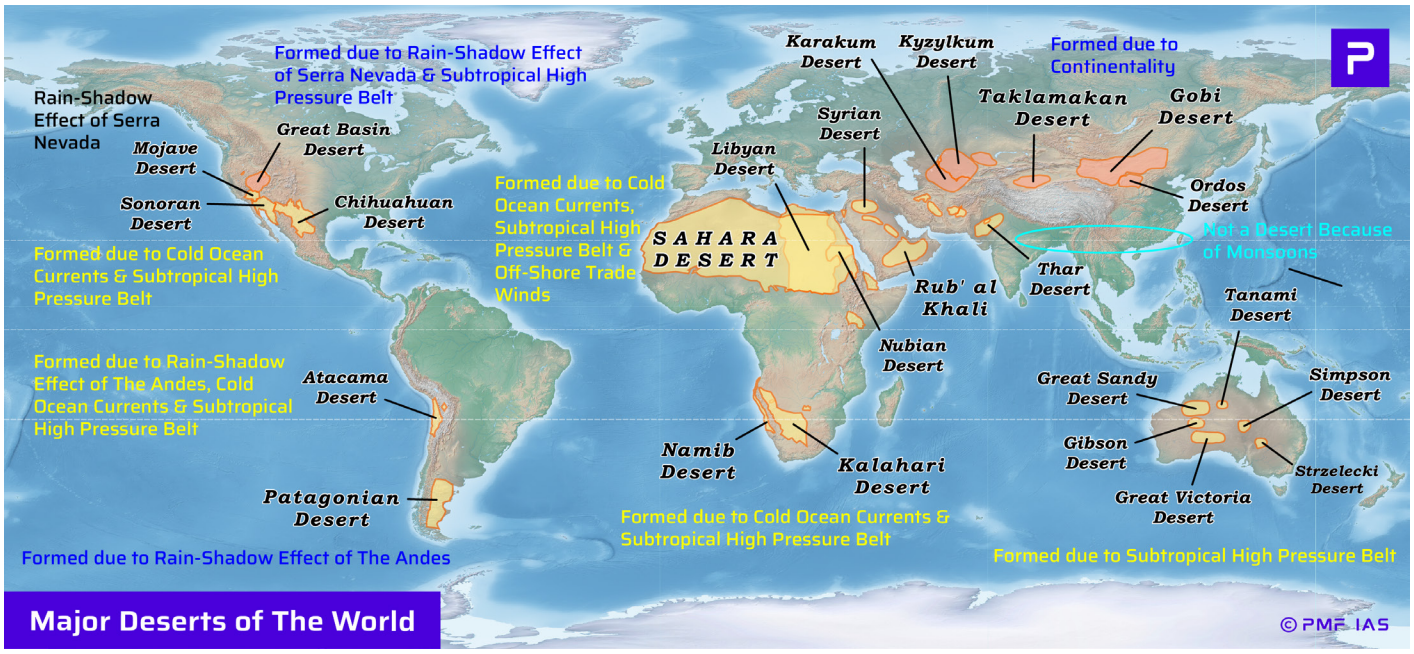
- The HKH region spans **3,500 km** and is spread across eight countries (Afghanistan, Bangladesh, Bhutan, China, India, Nepal, Myanmar, and Pakistan).
- It serves as the **source for ten major Asian river systems**: the **Amu Darya**, Indus, Ganges, Brahmaputra, **Irrawaddy**, **Salween**, **Mekong (Lancang)**, **Yangtze (Jinsha)**, **Yellow River (Huanghe)**, and Tarim.
- **Important Ranges:** Himalayas, Karakoram, Tien Shan, Kunlun Shan, Pamir, Hindu Kush, etc.
- **Important Peaks:** **Everest**, **K2**, **Kangchenjunga**, Lhotse, Makalu, Dhaulagiri, etc.

[UPSC 1995] Arakan Yoma is the extension of the Himalayas located in:

a) Baluchistan
b) Myanmar
c) Nepal
d) Kashmir

Answer: b) Myanmar

1.3. Major Deserts of Asia



1.3.1. Arabian Desert

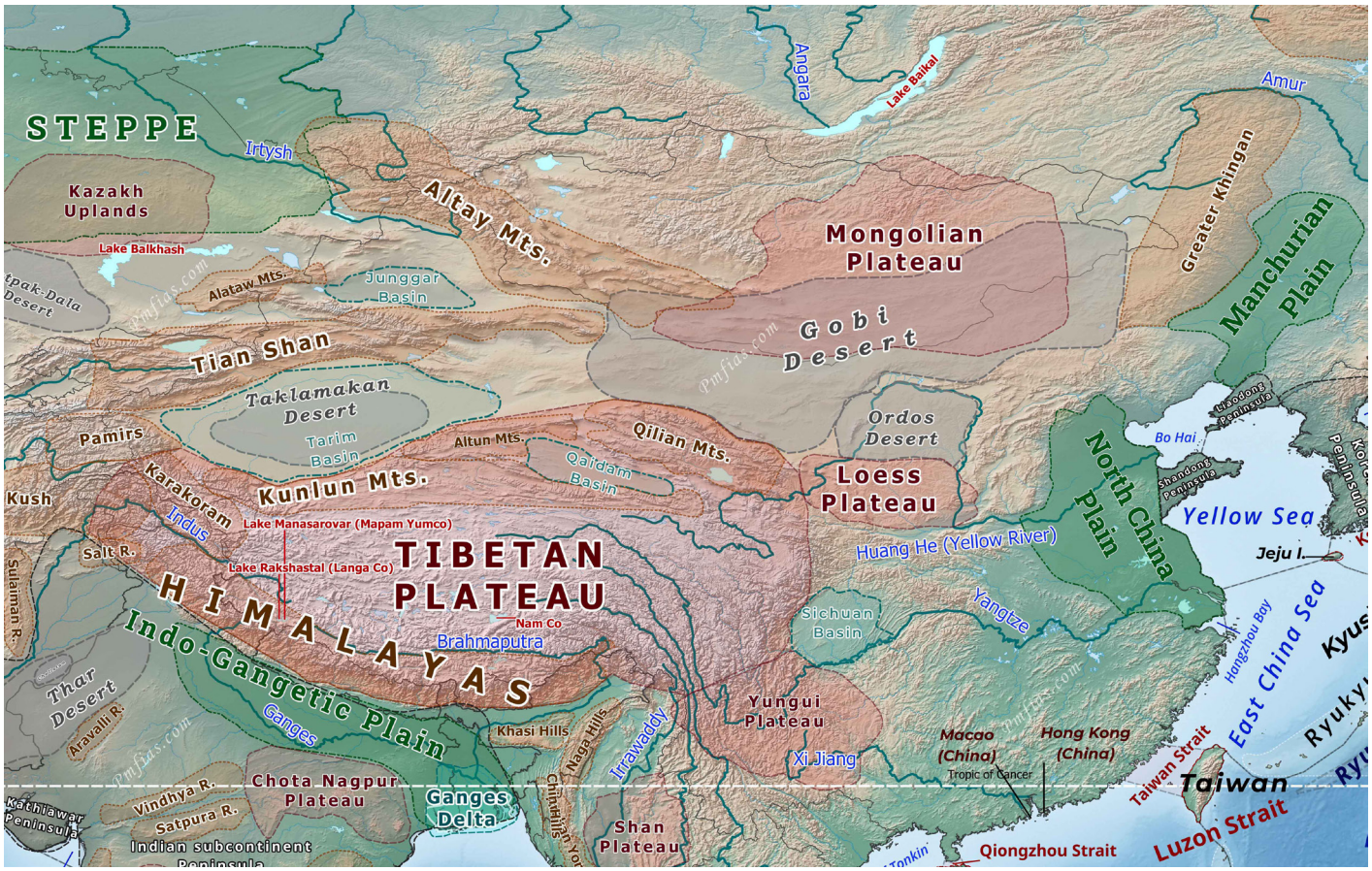
- The Arabian Desert encompasses almost the entire Arabian Peninsula, covering ~2,330,000 sq km. It lies **primarily within Saudi Arabia** but extends into Yemen, Oman, the United Arab Emirates, Qatar, Kuwait, Jordan, Egypt, and Iraq.

- It is a vast region of **sandy terrain** and includes large sand bodies such as **Rub'al-Khali** and **Al-Nafud**.
- It includes notable ranges such as **Mount Al-Nabi Shu'ayb**, **Mount Al-Lawz**, and **Mount Al-Sham**.
- The western Arabian Desert consists of the ancient Arabian platform, a segment of the **African Shield** composed mainly of **Precambrian gneiss**.
- The eastern part comprises **sedimentary rock layers** deposited over the past 541 million years on continental shelves and marine basins along the **Arabian platform's margins (rich in petroleum)**.
- The important fauna are Insects (locusts, scavenging dung beetles, scorpions, and spiders), Reptiles (monitor lizards, vipers, sand cobras, etc.), and Mammals (**gazelles** and **ibex**).
- **Oases** support date palms, juniper trees, alfalfa, onions, melons, barley, and wheat.

1.3.2. Gobi Desert

- The Gobi Desert (the Mongolian word 'gobi' means **'waterless place'**) is a vast desert expanse that extends across **southern Mongolia** and **northwestern China**. It is surrounded by mountains and is **broken by the hills of the Altai Mountains**.
- The desert is composed of **five distinct eco-regions**: the Gaxun Gobi, Junggar Gobi, and Trans-Altai Gobi in the west; Mongolian Gobi in the centre and east; and the Alxa Plateau or Ala Shan Desert in the south.
- The sandy desert only accounts for around 5% of the Gobi, with most of the desert being bare rock. Despite this, the Gobi is home to one of the world's biggest sand dunes — the **Khongor Sand Dunes**.
- It has a **continental climate with long**, **extremely cold winters** (below -20 °C in January to over 33 °C in July). It also experiences strong winds throughout the year.

- The Gobi Desert features **sparse vegetation**, and significant fauna include camels, gazelles, rodents, and reptiles. **Gobi brown bears** and **snow leopards** also inhabit the region.



1.3.3. Thar Desert

- The Thar Desert is a vast, arid region with **undulating sand hills**. It spans parts of **Rajasthan** state in northwestern India and **Punjab** and **Sindh provinces** in eastern Pakistan.
- The landscape is underlain by **ancient metamorphic rocks** like **Archean gneiss** and Proterozoic sedimentary rocks, overlaid by wind-deposited sand accumulated over the past 1.8 million years.
- The **saline lake beds** (known as '**dhands**') are scattered throughout the region.
- The desert vegetation is predominantly **herbaceous or stunted scrub**, with drought-resistant trees scattered in the eastern region. On the hills, **gum Arabic acacia** and **euphorbia** can be found, while the **'khajri' (or 'khejri') tree** grows throughout the plains.
- The sparsely populated grasslands support **blackbucks**, **chikara (gazelles)**, various feathered game-like francolins (partridges) and quail. The desert is also home to the endangered **Great Indian Bustard**.

1.3.4. Taklamakan Desert

- The Taklamakan Desert is located in the central part of the Tarim Basin in the **Uyghur Autonomous Region of Xinjiang**, **western China**. It is **surrounded by high mountain ranges** — the **Tien Shan** to the north, the **Kunlun Mountains** to the south, and the **Pamirs** to the west.
- The desert's surface comprises thick, friable alluvial deposits affected by wind action, with a wind-borne sand cover reaching up to 1,000 feet thick.
- The **Tarim depression** is an **internal drainage basin**; the entire runoff from the surrounding mountains collects within the basin, feeding the rivers and groundwater strata.
- **Vegetation is extremely sparse**, with almost the entire region lacking plant cover. The sand dunes are home to numerous small mammals such as rabbits, gerbils, field mice, and jerboas.

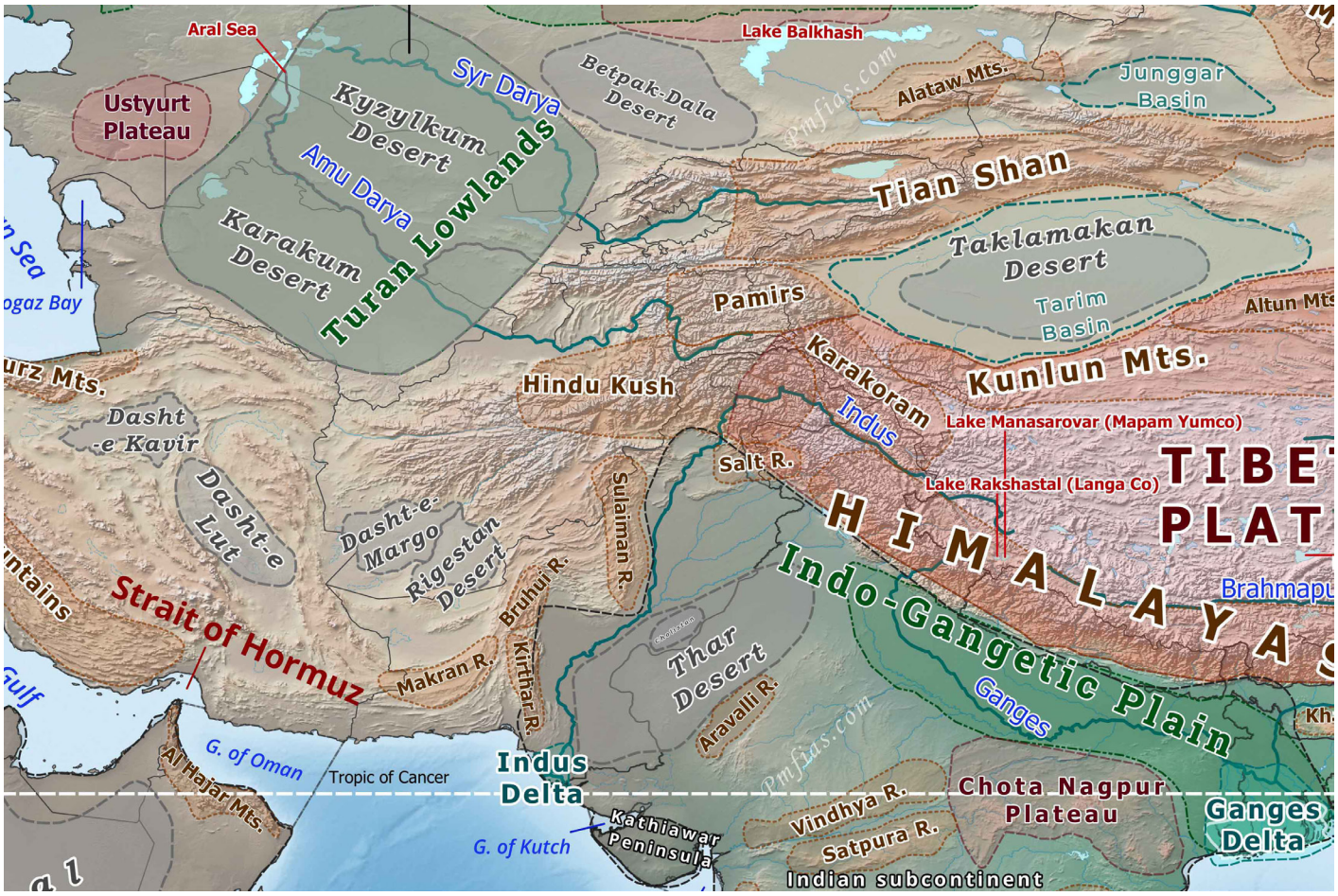
1.3.5. Syrian Desert

- The Syrian Desert is an **arid wasteland** in **southwestern Asia**, extending northward from the Arabian Peninsula across much of northern **Saudi Arabia**, eastern **Jordan**, southern **Syria**, and western **Iraq**.
- The average annual rainfall is **less than 125 mm** and is predominantly **covered by lava flows**.
- It forms a nearly impenetrable barrier between the populated regions of the **Levant** and **Mesopotamia**.
- The desert's southern sector, commonly known as **Al-Ḥammād**, is home to several nomadic tribes and breeders of Arabian horses.

1.3.6. Karakum Desert

- The **Karakum Desert** is a **vast sandy region** that occupies about 70 per cent of **Turkmenistan's** area. (Another smaller desert, the **Aral Karakum**, is situated near the **Aral Sea** in **Kazakhstan**.)
- The desert is divided into three distinct parts: the elevated northern **Trans-Unguz Karakum**, **the low-lying Central Karakum**, and **the southeastern Karakum**, which is traversed by a chain of salt marshes.
- The **Unguz chain of saline**, isolated, eolian (wind-formed) hollows runs along the border between the Trans-Unguz and Central Karakum regions.

- The vegetation of the Karakum is diverse and mainly consists of grasses, small shrubs, bushes, and trees.



1.4. Major Islands of Asia

1.4.1. Indonesia Archipelago

- Indonesia, the **world's largest archipelago**, comprises over 17,500 islands spanning the Pacific and Indian Oceans, bridging Asia and Australia/Oceania.
- The five main islands are **Sumatra**, **Java**, **Kalimantan**, **Sulawesi**, and **Papua**. With 583 languages and dialects reflecting its diverse ethnic groups, the national language is Bahasa Indonesia.

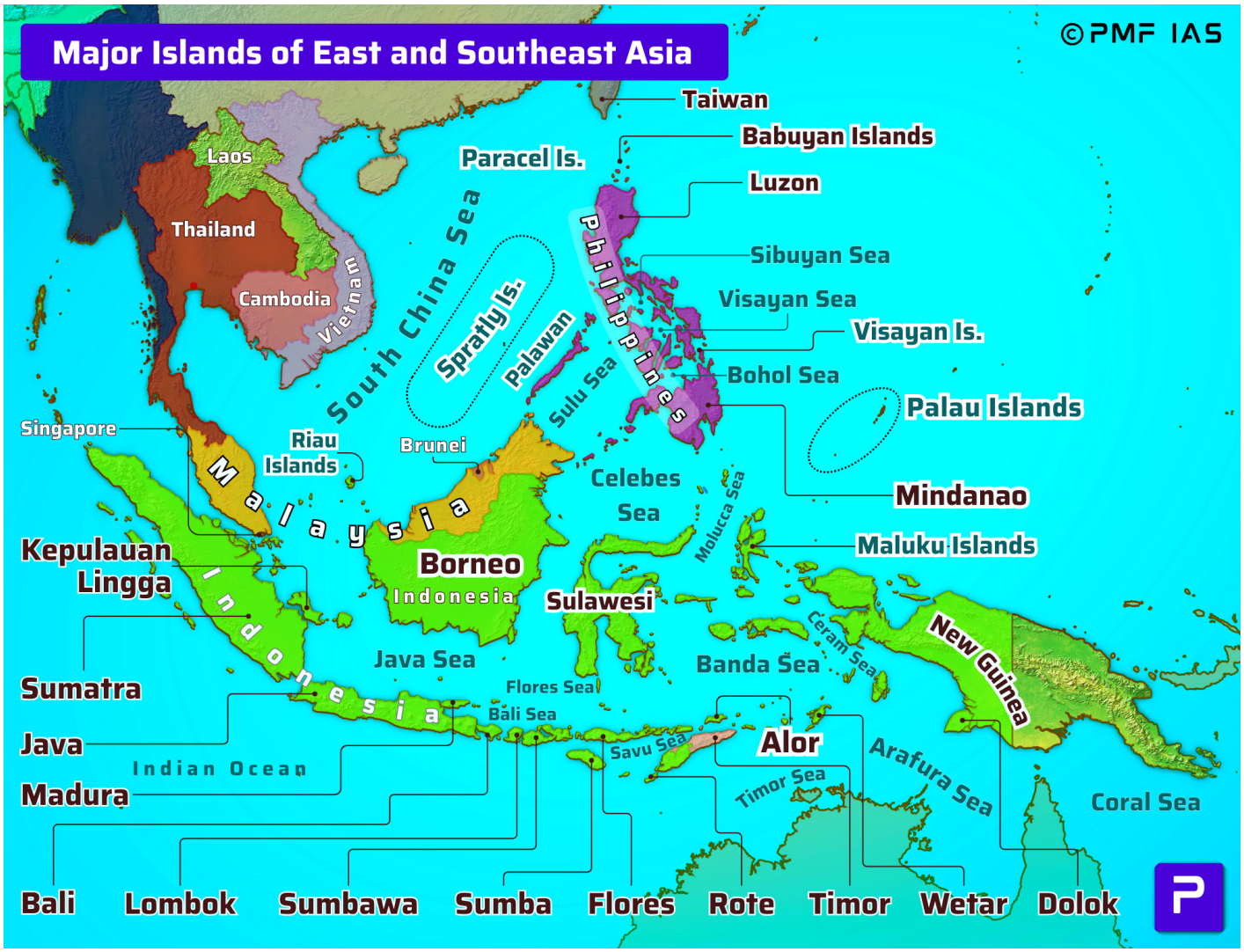
1.4.2. New Guinea

- It is the **second-largest Island** in the world (**1st – Greenland**).
- It is located in **Melanesia**, the Southwest Pacific Ocean, north of Australia.
- It is divided into two parts: the eastern part is **Papua New Guinea**, and the western part is an **Indonesian Province**.
- **Mount Wilhelm (~4,500 m)**, part of the **Bismarck Range**, is the highest peak of Papua New Guinea.

1.4.3. Borneo

- It is the **third-largest island** in the world.
- It is located in maritime Southeast Asia, north of Java, west of Sulawesi, east of Sumatra

- Its land area is shared by **Indonesia (Kalimantan)**, **Malaysia (Sarawak and Sabah)**, and **Brunei**.
- Mount Kinabalu in Sabah is the highest peak of Borneo.

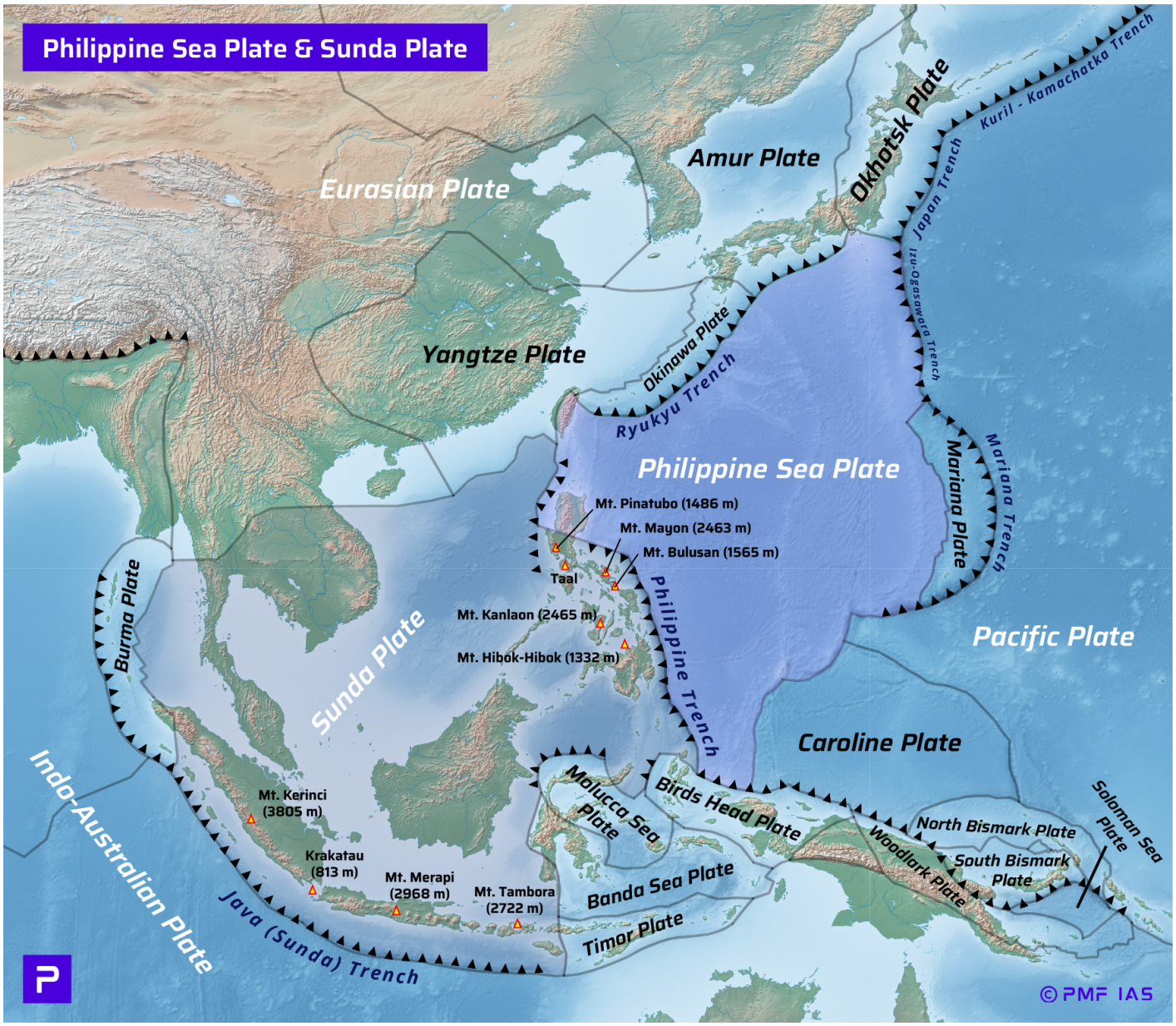


1.4.4. Sumatra

- It is an Indonesian island situated in the Malay Archipelago. It is the second-largest island among the **Greater Sunda Islands** after **Borneo**. The **Strait of Malacca** separates it from the **Malay Peninsula** to the northeast and from the island of **Java** to the south by the Sunda Strait.
- In May 2024, Cold lava from **Mount Marapi (the most active volcano in Sumatra)** resulted in the death of more than 40 people, and many went missing. Cold lava, known as "**lahar**" in Indonesian, is a mixture of volcanic material and pebbles that flows down the slopes of a volcano during rainfall.

1.4.5. Java

- Java, an island in Indonesia, is located southeast of Malaysia and Sumatra, south of Borneo, and west of Bali. It is home to approximately **half of Indonesia's population**.
- **Jakarta** is Indonesia's capital and largest city and is located on the Java coast.
- **Mount Semeru (~3,676 m)** is the highest volcano.



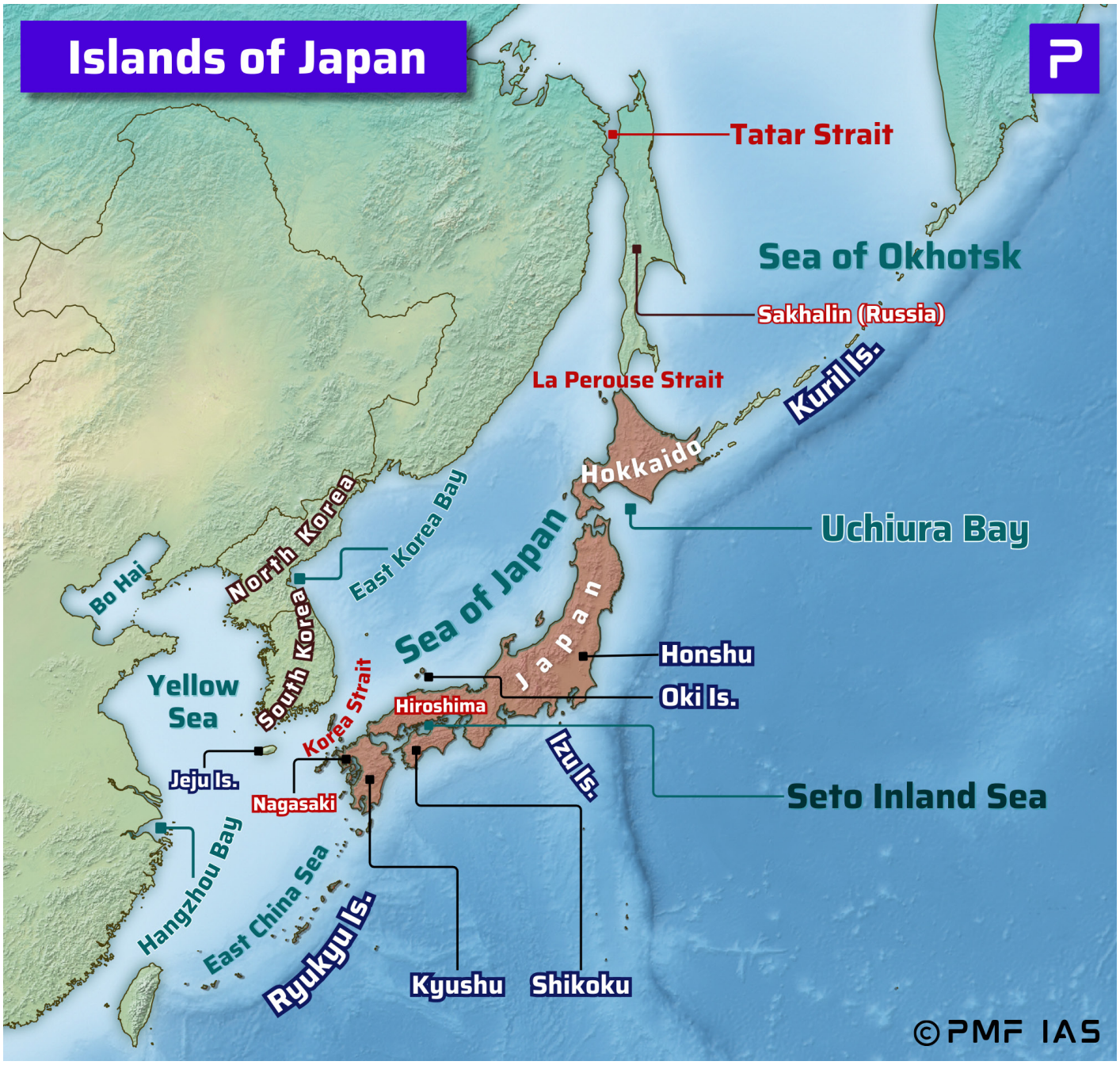
1.4.6. Sri Lanka

- It is an island nation in the Indian Ocean, separated from India by the **Palk Strait**. It has two capitals: Colombo (the executive and judicial capital) and Sri Jayewardenepura Kotte (the legislative capital).
- The Central Highlands, a roughly triangular mountainous area, dominates the south-central region. A diverse plain encircles this highland mass, making up approximately five-sixths of the country's area.

1.4.7. Japan

- It is an island country surrounded by the **Sea of Okhotsk** (north), East China Sea (south), Sea of Japan (East) and Pacific Ocean (west). It comprises the four large islands of **Hokkaido**, **Honshu**, **Shikoku**, and **Kyushu**, as well as other smaller islands. The capital and most populous city is **Tokyo** in **Honshu**.
- **Honshu** is the largest and most populous island of Japan. **Hokkaido** (Northern Japan) is the second-largest. It is separated from Honshu by the Tsugaru Strait.

- Japan's landscape is predominantly rugged, with over four-fifths of its land surface consisting of mountains. There are numerous volcanoes, and **Mount Fuji (3,776 meters)** is the highest mountain in Japan.
- Dissected plains are common, resulting from intense geological disturbances that have significantly uplifted former alluvial fans, deltas, and sea bottoms into flat-topped uplands (E.g. Kanto Plain).



1.4.8. Taiwan

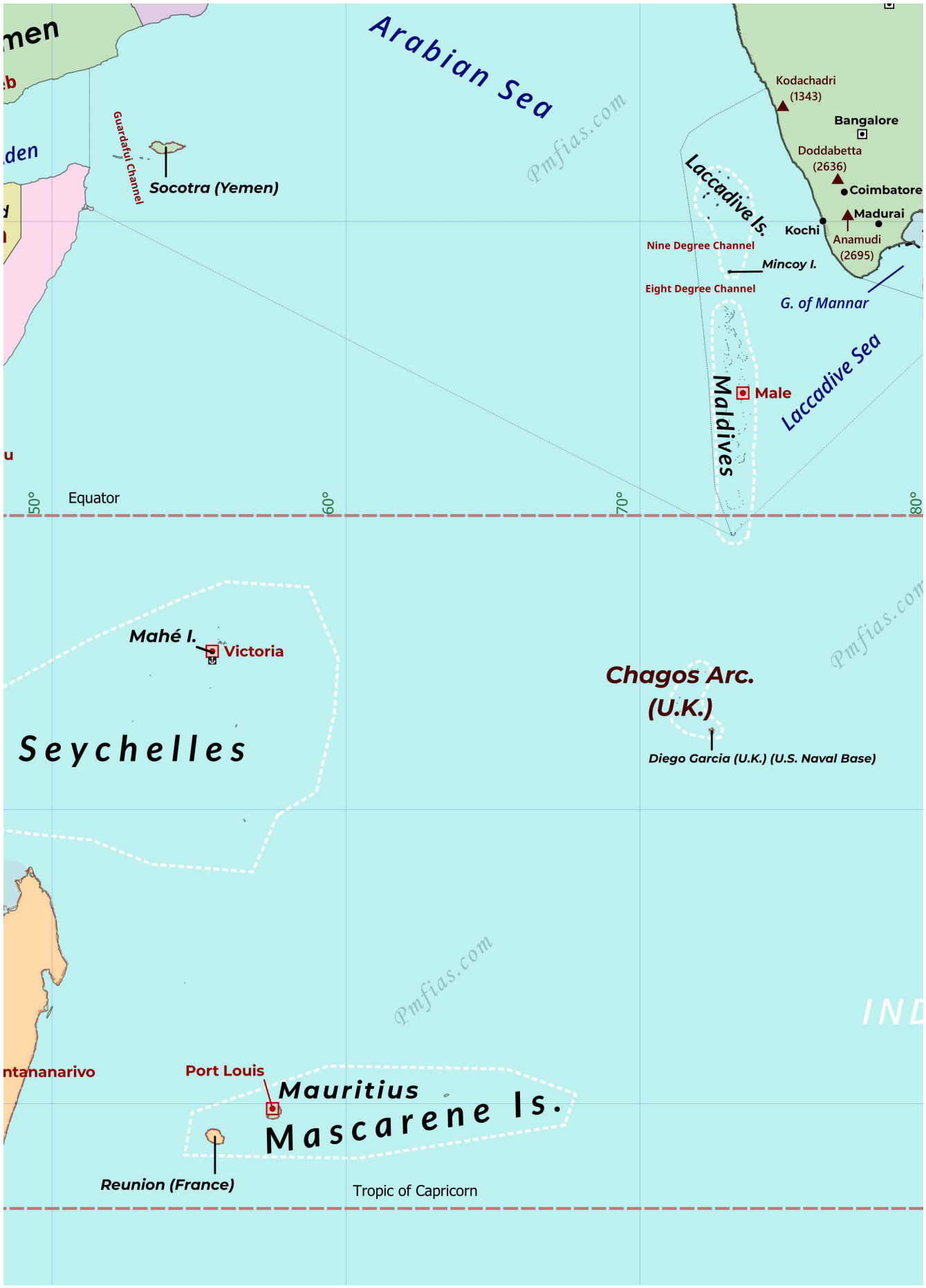
- Taiwan is an island in the western Pacific Ocean, roughly 160 km off the southeastern coast of China. It is separated from mainland **China** by the **Taiwan Strait**. It is roughly oval and part of a chain of islands extending from Japan southward through the Philippines to Indonesia.
- Mountains cover about two-thirds of Taiwan's area. The highest mountains are in the Chung-yang Range in the east, which runs along the north-south axis.

1.4.9. Philippines

- The Philippines is an island country in Southeast Asia in the western Pacific Ocean. It comprises more than 7,000 islands and islets.
- The Philippine archipelago is surrounded by the **Philippine Sea** to the east, the **Celebes Sea** to the south, the **Sulu Sea** to the southwest, and the **South China Sea** to the west and north.
- The islands are primarily composed of volcanic rock and coral, with mountain ranges generally aligned in a north-south direction.

1.4.10. Maldives

- The Maldives consists of approximately 1,200 small coral islands and sandbanks, of which around 200 are inhabited. These islands are grouped in clusters, known as atolls. All the islands are characterised by their low-lying nature, with none rising more than 6 feet (1.8 meters) above sea level.
- **Male** is the capital city located in the central region.


Arabian Sea
Guardafui Channel
Socotra (Yemen)
Kodachadri
(1343)
Bangalore
Doddabetta
(2636)
Coimbatore
Madurai
Kochi
Anamudi
(2695)
Laccadive Is.
Nine Degree Channel
Mincoy I.
Eight Degree Channel
G. of Mannar
Laccadive Sea
Male
Maldives
Equator
50°
60°
70°
80°
Mahé I.
Victoria
Seychelles
Chagos Arc.
(U.K.)
Diego Garcia (U.K.) (U.S. Naval Base)
Port Louis
Mauritius
Mascarene Is.
Reunion (France)
Tropic of Capricorn
pmfias.com

[UPSC 2014] What is the correct sequence of occurrence of the following cities in South-East Asia as one proceeds from south to north?

1. Bangkok
2. Hanoi
3. Jakarta
4. Singapore

Select the correct answer using the code given below:

a) 4-2-1-3

b) 3-2-4-1

c) 3-4-1-2

d) 4-3-2-1

Answer: c) 3-4-1-2

[UPSC 2011] Between India and East Asia, the navigation time and distance can be greatly reduced by which of the following?

1. Deepening the Malacca Straits between Malaysia and Indonesia.
2. Opening a new canal across the Kra isthmus between the Gulf of Siam and Andaman Sea.

Which of the statements given above is/are correct?

a) 1 only

b) 2 only

c) Both 1 and 2

d) Neither 1 nor 2

Explanation

- The Kra Isthmus is a **narrow landmass in southern Thailand** that separates the Gulf of Thailand to the east and the Andaman Sea to the west.
- Currently, ships travelling between the Indian Ocean and the South China Sea/East Asia have to take the longer route through the Malacca Strait, around Singapore, and into the South China Sea.
- If a canal were to be constructed across the Kra Isthmus, it would create a shortcut, **allowing ships to bypass the Malacca Strait** and travel directly between the Indian Ocean and the South China Sea.

Answer: b) 2 only

[UPSC 2010] Which one of the following can come across if one travels through the Strait of Malacca?

a) Bali

b) Brunei

c) Java

d) Singapore

Answer: d) Singapore

[UPSC 2009] Which one of the following is the country's administrative capital, the new federal administrative centre of Malaysia?

a) Kota Bharu

b) Kuala Terengganu

c) Putrajaya

d) Taiping

Answer: c) Putrajaya

[UPSC 2008] Which of the following cities is nearest to the equator?

a) Colombo
b) Jakarta
c) Manila
d) Singapore

Answer: d) Singapore

[UPSC 2007] Match List I with List II and select the correct answer using the code given below the lists:

List-I (City)	List-II (River)
A. Bangkok	1. Irrawaddy
B. Phnom-Penh	2. Mekong
C. Hanoi	3. Menam (Chao Phraya)
D. Yangon	4. Red River

Codes:

a) A-3; B-2; C-4; D-1
b) A-4; B-1; C-3; D-2
c) A-3; B-1; C-4; D-2
d) A-4; B-2; C-3; D-1

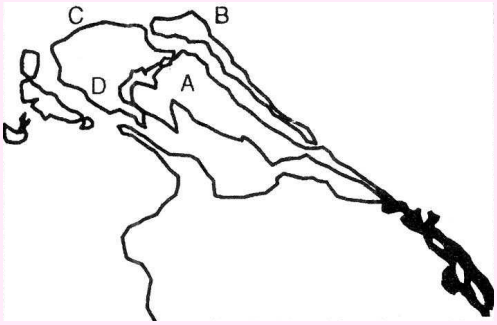
Answer: a) A-3; B-2; C-4; D-1

[UPSC 1997] "From Aceh in the far north west to Torres Strait in the east is 5000 miles, almost as far as from London to Baghdad. The archipelago has 14,000 islands, some mere equatorial rocks, others some of the largest in the world." This description best fits:

a) West Indies
b) Japan
c) Philippines
d) Indonesia

Answer: d) Indonesia

[UPSC 1996] A rough outline map of northern Sri Lanka is shown below. Jaffna is located at the point marked:



a) A
b) B
c) C
d) D

Answer: d) D

1.5. Other Important Geographical Features of Asia

1.5.1. Black Sea

- The Black Sea is a **large inland sea** and the largest **meromictic** basin (the **layers of water do not intermix**, and vertical movement of water is rare) in southeastern Europe. It lies:
  - ✓ East of the **Balkan Peninsula** (Southeast Europe)
  - ✓ South of the Eastern European Plain in Eastern Europe
  - ✓ West of the **Caucasus**
  - ✓ North of **Anatolia** (**Asia Minor**; a peninsula that makes up the majority of the land area of Turkey) in Western Asia.

- It connects to the distant waters of the Atlantic Ocean via a series of waterways: the **Bosporus** (emerging from its southwestern corner), the **Sea of Marmara**, the **Dardanelles**, the **Aegean Sea**, and the **Mediterranean Sea**. To the north, it is connected to the **Sea of Azov** by the **Kerch Strait**.
- It is supplied by **major rivers**, principally the **Danube**, **Dnieper and Don**. It ultimately drains into the **Mediterranean Sea** via the **Turkish Straits and the Aegean Sea**.
- Important coastal cities include **Istanbul**, **Odesa**, **Sevastopol**, **Novorossiysk**, Burgas, Batumi, etc.
- **Countries bordering the Black Sea: Tea and BURGeR**
  - T: Turkey
  - B: Bulgaria
  - U: Ukraine
  - R: Russia
  - G: Georgia
  - R: Romania

Sea of Marmara

- The **Sea of Marmara** is an **inland sea** separating the Asian and European parts of Turkey. It serves as a **transitional zone** between the Black Sea and the Mediterranean Sea and is an essential maritime waterway for transporting petroleum and natural gas to Europe from the western parts of Asia and Russia.
- It is connected through parts of the **Turkish Straits System**:
  - ✓ The **Bosporus Strait** on the northeast with the **Black Sea**
  - ✓ **Dardanelles** on the southwest with the **Aegean Sea**
- The **North Anatolian Fault**, which runs beneath the sea, has caused several massive earthquakes.
- Some of the important coastal towns and cities that are located along the Sea of Marmara include **Istanbul**, Izmit, Balikesir, Yalova, Tekirdag, Bursa, and Çanakkale.
- **Marmara Island** is Turkey's second-largest and largest island in the Marmara Sea. It is also a **rich source of marble**.

[UPSC 2014] Turkey is located between

a) Black Sea and Caspian Sea
b) Black Sea and Mediterranean Sea
c) Gulf of Suez and Mediterranean Sea
d) Gulf of Aqaba and Dead Sea

Explanation

- **Turkey** is geographically located between the **Black Sea** to the north and the **Mediterranean Sea** to the south. It serves as a bridge between Europe and Asia, with its territory straddling both continents.
- Turkey does not border the Caspian Sea.
- The Gulf of Suez is located near Egypt, not Turkey.

- Gulf of Aqaba and Dead Sea are located near Jordan and Israel, not Turkey.

Answer: b) Black Sea and Mediterranean Sea

1.5.2. Caspian Sea

- The Caspian Sea is the **world's largest inland body of water** (**endorheic basin** – a drainage basin without outflow). It is a **brackish water body**, and the salinity is one-third of the average salinity of the oceans.
- Its primary freshwater inflow comes from Europe's longest river, the **Volga** and the **Ural Rivers**.
- Like the Black Sea, the Caspian Sea is a **remnant** of the ancient **Paratethys Sea** (the seafloor is composed of oceanic basalt, not continental granite).
- It is bounded by **Turkmenistan**, **Azerbaijan**, **Russia**, **Iran**, **and Kazakhstan** (Shortcut – **TARIK**).
- The crucial seaports are **Baku** (Azerbaijan), Aktau Port (Kazakhstan), Astrakhan Port (Russia), **Bandar Anzali Port** (Iran), etc.

[UPSC 2019] Consider the following pairs:

Sea	***Bordering country***
1. Adriatic Sea -	Albania
2. Black Sea -	Croatia
3. Caspian Sea -	Kazakhstan
4. Mediterranean Sea -	Morocco
5. Red Sea -	Syria

Which of the pairs given above are correctly matched?

a) 1, 2 and 4 only
b) 1, 3 and 4 only
c) 2 and 5 only
d) 1, 2, 3, 4 and 5

Answer: b) 1, 3 and 4 only

[UPSC 2004] Match List-I with List-II and select the correct answer using the codes given below:

List-I (Sea)	List-II (Country)
A. Black Sea	1. Bulgaria
B. Red Sea	2. China
C. Yellow Sea	3. Eritrea
D. Caspian Sea	4. Kazakhstan

Codes:

a) A-1; B-4; C-2; D-3
b) A-2; B-3; C-1; D-4
c) A-1; B-3; C-2; D-4
d) A-2; B-4; C-1; D-3

Answer: c) A-1; B-3; C-2; D-4

[UPSC 2003] Which one of the following countries does not border the Caspian Sea?

a) Armenia
b) Azerbaijan
c) Kazakhstan
d) Turkmenistan

Answer: a) Armenia

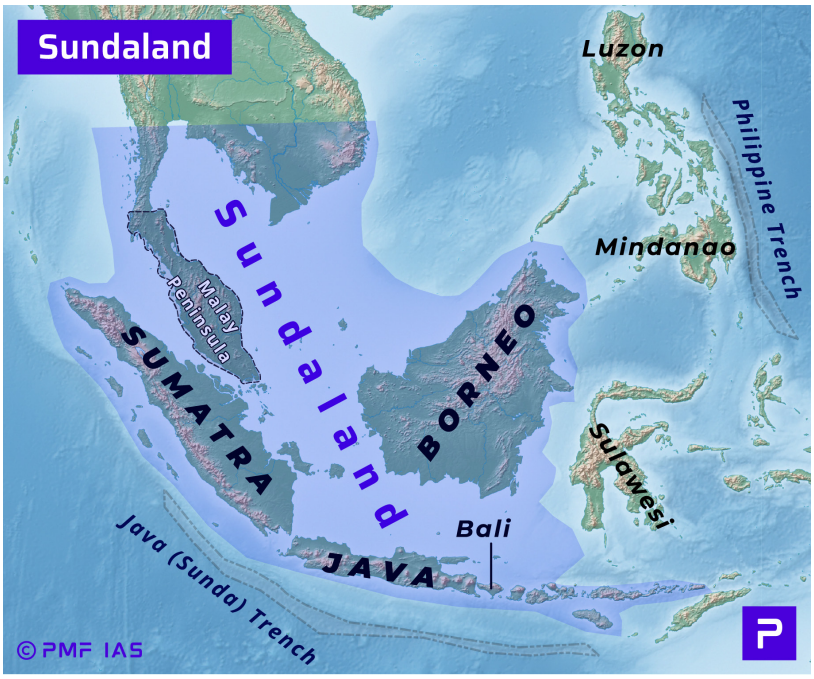
1.5.3. South China Sea

- It is a vast, strategic sea in the western Pacific Ocean, bordering the Southeast Asian mainland. It connects to the **East China Sea** through the **Taiwan Strait** to the northeast.
- It is bordered by Brunei, China, Indonesia, Malaysia, the Philippines, Taiwan, and Vietnam (Shortcut: "**VIP China MBT**" as "Very Important People, China Mein Bade Tareef" (Very Important People, praised in China)).

Eastern Deep Basin

- It is a deep, **rhombus-shaped basin** in the eastern part of the South China Sea. **Steep reef-studded shoals** rise within the basin to the south (Reed and Tizard banks, Nanshan Island area) and northwest (**Paracel Islands**, Macclesfield banks)

Sunda Shelf



- It is a shallow trough around 40 meters deep at the edges, up to 100 meters in the centre, **c**overing the southern South China Sea, the Gulf of Thailand, and the Java Sea.
- To the south of Vietnam, the **continental shelf narrows** and connects to the vast Sunda Shelf between Borneo, Sumatra, and the Malay Peninsula.

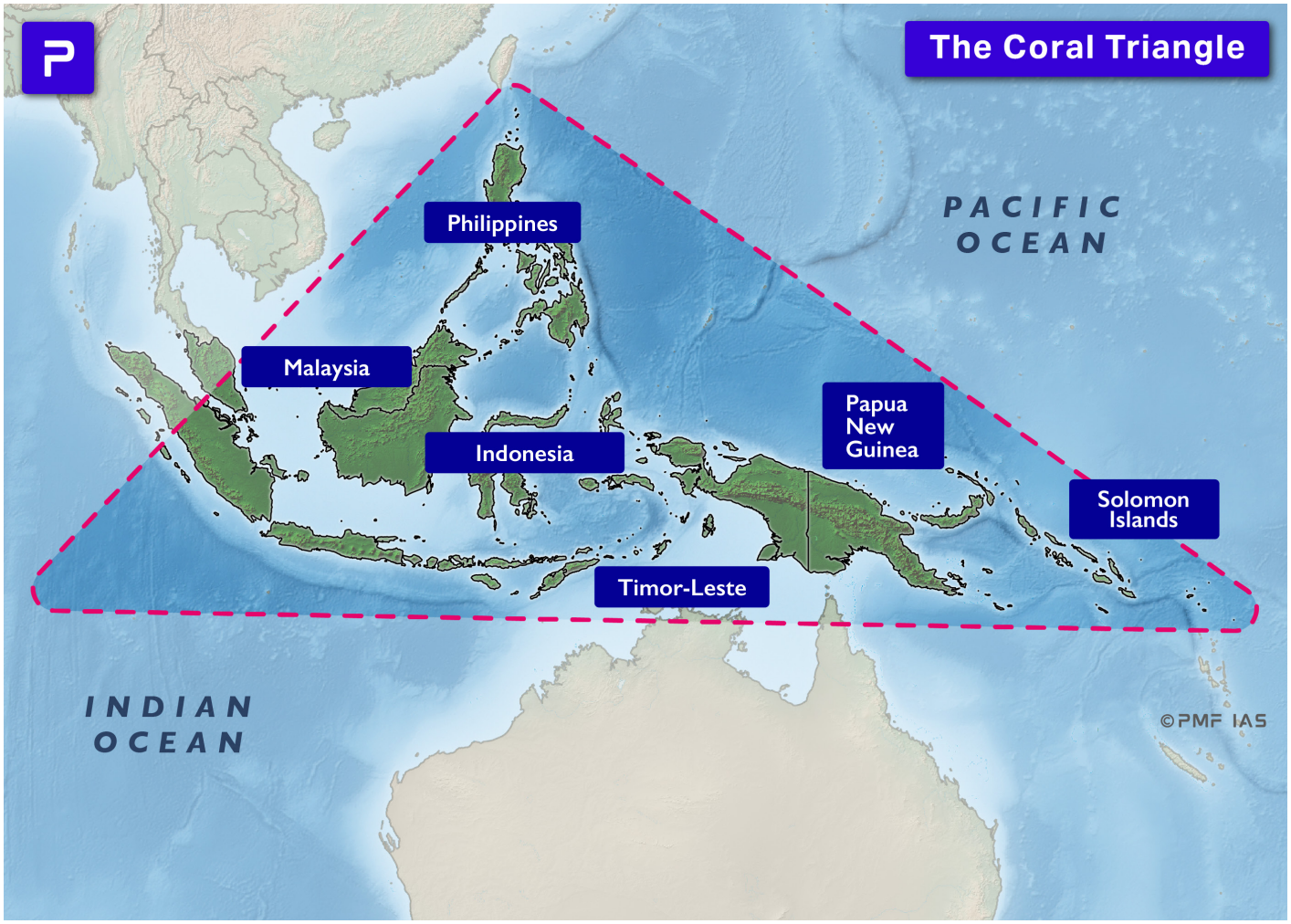
- Submerged river valleys on the shelf bottom converge into the **Sunda Depression and** the China Sea Basin.

South China Sea Dispute

- The South China Sea dispute involves multiple countries, notably China, with conflicting territorial claims. China's assertion of sovereignty over nearly 90% of the sea, marked by the "**nine-dash line**," has **increased tensions** and **militarisation of artificial islands**.
- Despite international opposition and a tribunal ruling against China's claims, finding a diplomatic resolution remains challenging.

1.5.4. Coral Triangle

- The **Coral Triangle**, spanning **Indonesia**, **Malaysia**, the **Philippines**, **Papua New Guinea**, the **Solomon Islands**, and **Timor Leste**, is the world's most diverse marine ecosystem. It has 76% of all known coral species and 37% of the world's total coral reef fish. Hence, it is usually called the '**Amazon of the seas**'.



Particularly Sensitive Sea Area (PSSA)

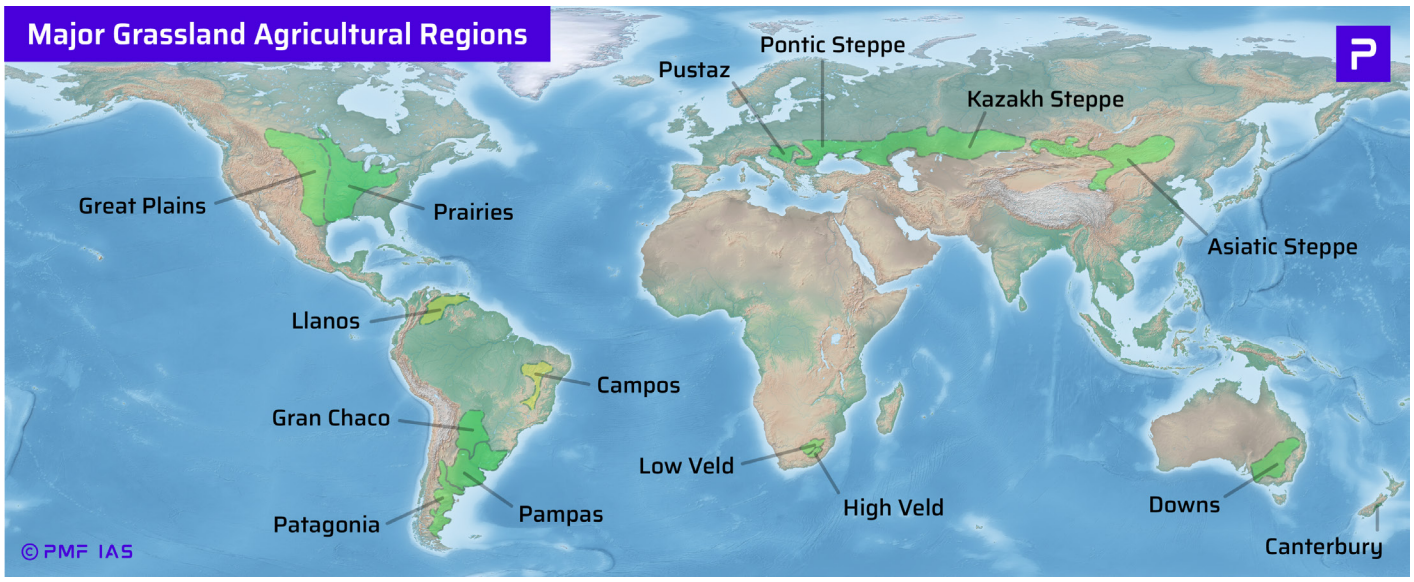
- A PSSA is a **highly sensitive** and **highly protected marine location** internationally recognised to protect it from harmful maritime activities because of its ecological, socioeconomic or scientific significance.
- The **International Maritime Organisation (IMO)** stressed the guidelines for designating the Coral Triangle as a PSSA.

1.5.5. Eurasian Steppe

- The Eurasian Steppe is the **world's most extensive temperate grassland**, covering nearly 8,000 km from Hungary to China. It is divided into two major segments: the Western and Eastern Steppes.

Western Steppe	Eastern Steppe
• Extends from the grassy plains at the mouth of the **Danube River** along the north shore of the Black Sea, across the lower Volga, and eastward as far as the Altai Mountains.	• Extends from the **Altai Mountains** on the west to the Greater Khingan Range on the east, embracing Mongolia and adjacent regions. • It is **smaller than the Western Steppe**.
• **Pannonian Steppe** and **Pontic-Caspian Steppe** are part of it.	• The **Kazakh Steppe** and **Mongolian-Manchurian Steppe** belong to this part.
• Milder temperature extremes and rainfall are more consistent, especially in Ukraine and Romania.	• Harsher temperature extremes and rainfall are less consistent with more extreme precipitation patterns.
• Easier cross-country movement and migration for better pastures	• Reliance on irrigation from mountain streams, significant oasis settlements

- The **grasses are typically shorter**. E.g., blue grama, buffalo grass, sagebrush, and spear grass.
- The significant fauna includes badgers, hawks, snakes, etc.



Mongolian-Manchurian grassland

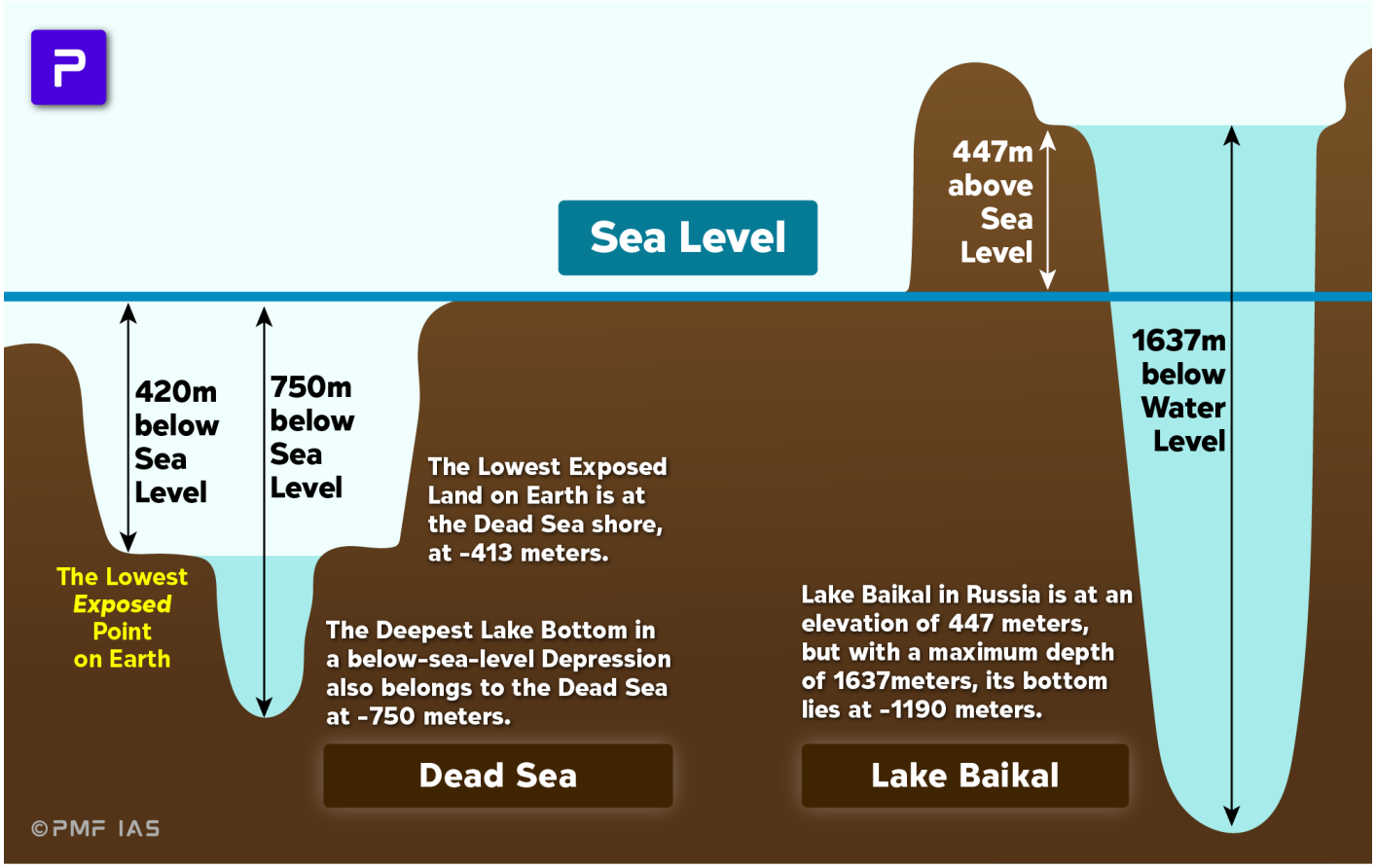
- The Mongolian–Manchurian grassland is located between Siberian conifer forests, Central Asian rocky deserts, and the Manchurian hills of Northeastern China. The elevation ranges from 1,000 to 1,300 m.
- The grasslands consist of **medium to tall grasslands**, dominated by **feather grass**. It supports a variety of animals, such as **Mongolian gazelles** (flagship species), wolves, foxes, etc.

1.5.6. Lake Baikal

- It is located in **southern Siberia**. It is the **oldest** and **deepest lake in the world** (1,600+ metres deep).

- It is the **world's second-largest lake by volume** (the **Caspian Sea is the largest lake**) and the **world's largest freshwater lake by volume**. It contains **20% of the world´s unfrozen freshwater reserves**.
- Lake Baikal is home to unique species, including the **Baikal seal**, the only seal that lives in freshwater, and the **golomyanka**, a fish found exclusively in this lake.

1.5.7. Dead Sea



- The **Dead Sea (Salt Sea)** is the world's lowest lake. Located in the **Jordan Valley** between **Israel** and **Jordan**, its surface is approximately **420 meters** below sea level. It's also the **saltiest lake** in the world, with a salinity **9.6** times that of the ocean. Hence, **humans can easily float in the Dead Sea** because of the natural buoyancy offered by the dense saline water. (**Great Salt Lake in Utah** in the United States and a few other saline lakes in the world offer buoyancy comparable to the Dead Sea).
- The Dead Sea formed when tectonic movements between the African and Arabian plates cut off a saltwater lagoon from the Mediterranean Sea.

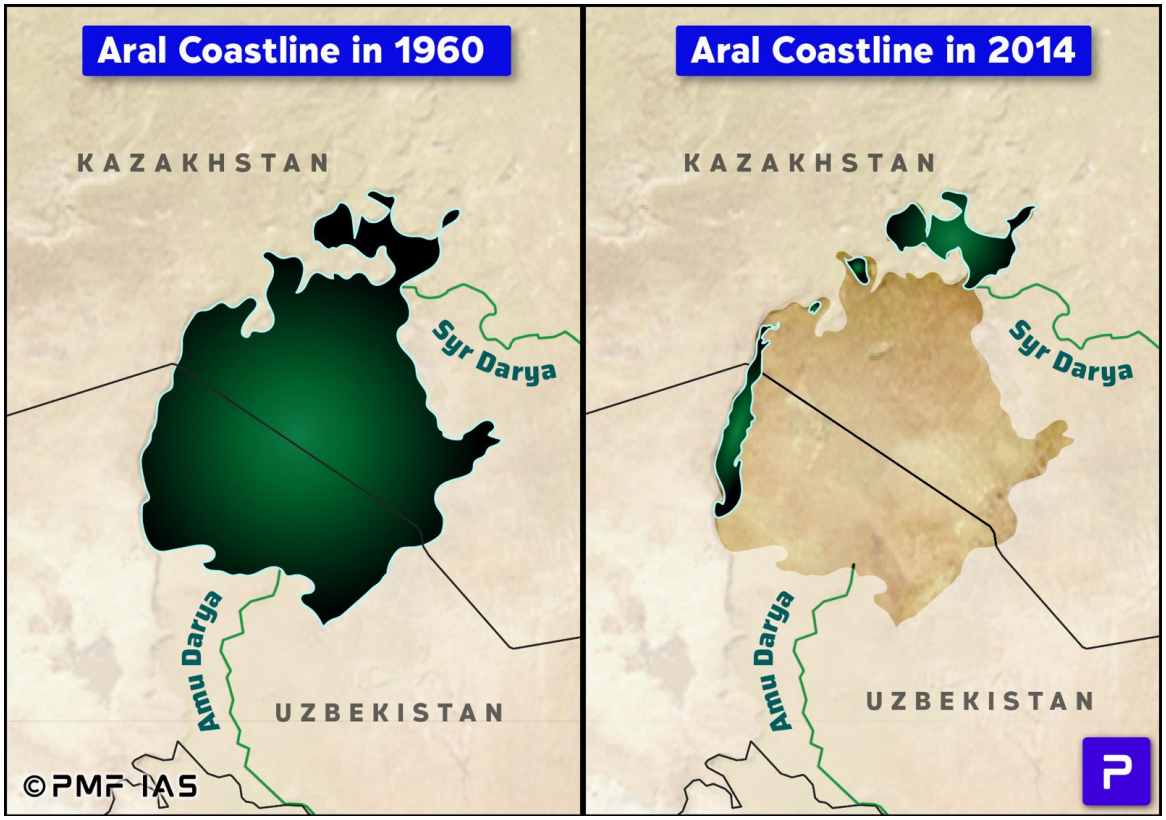
Lowest Point vs. The Deepest Lake

- There is a fundamental difference between the lowest point on land and the deepest lake.
- The Dead Sea is **Earth's lowest elevation on land**. It is **420 meters below sea level** and 306 meters deep. The lowest point of the Dead Sea is 420 + 306 = 726 meters below sea level.
- Lake Baikal is the **deepest lake**. Its depth is 1,642 m. Considering that the lake's surface is 455.5 m above sea level, the deepest point of Lake Baikal is 1186.5 m below sea level.

Dead Sea
Tripoli
Beirut
LEBANON
Damascus
SYRIA
Mediterranean Sea
Sea of Galilee
Golan Heights
Haifa
West Bank (Palestine)
Netanya
Tel Aviv-Yafo
Ramallah
Amman
Gaza Strip (Palestine)
Jerusalem
Netzarim Corridor
Gaza
Hebron
Port Said
Rafah
Dead Sea
ISRAEL
Suez Canal
JORDAN
Great Bitter Lake
Suez
SINAI PENINSULA (EGYPT)
Aqaba
Gulf of Suez
Gulf of Aqaba
SAUDI ARABIA
EGYPT
Sharm El-Sheikh
Red Sea
©PMF IAS

1.5.8. Aral Sea

- It is an **endorheic** saltwater lake between **Kazakhstan in the north** and **Uzbekistan in the south**. It has been **steadily shrinking since the 1960s**, after the rivers (**Amu Darya** and **Syr Darya**) that fed the lake were diverted to feed Soviet irrigation projects.



[UPSC 2018] Which of the following has/have shrunk immensely/dried up in the recent past due to human activities?

1. Aral Sea
2. Black Sea
3. Lake Baikal

Select the correct answer using the code given below:

a) 1 only
b) 2 and 3
c) 2 only
d) 1 and 3

Explanation

- According to NASA, the **Aral Sea** has shrunk by approximately **75% over the past 50 years**, primarily due to water being diverted for agricultural purposes in the surrounding regions.

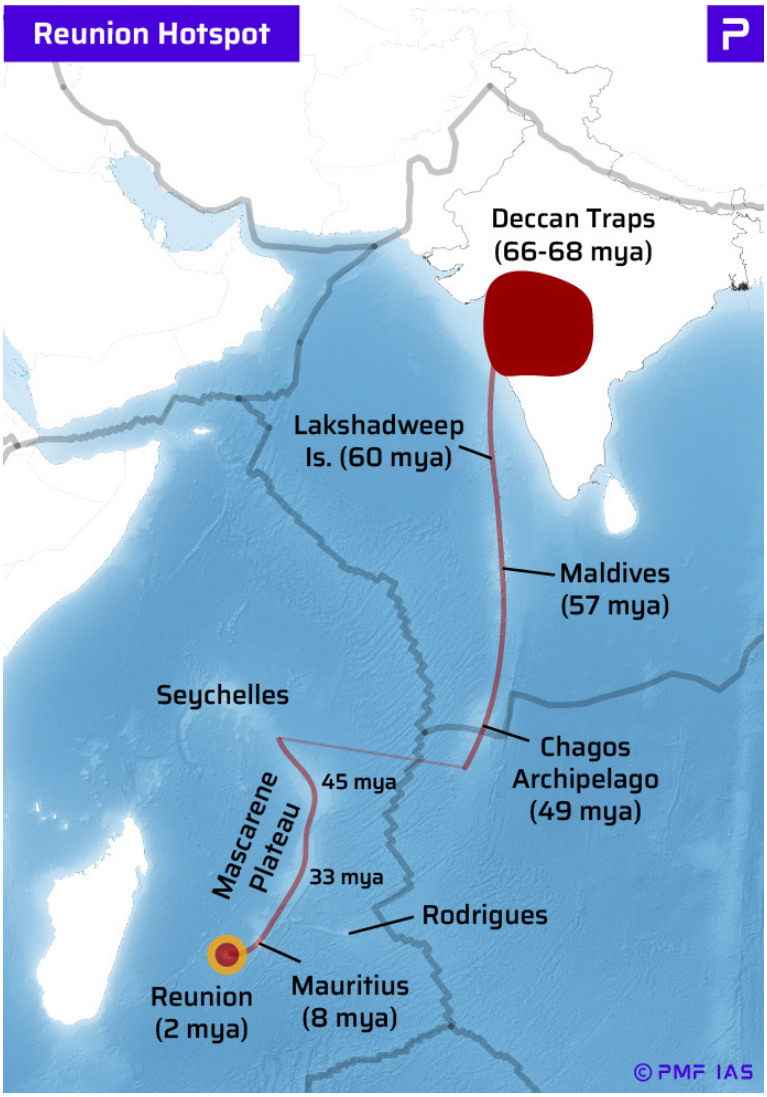
Answer: a) 1 only

1.5.9. Tibetan Plateau

- It is formed due to the collision of the Indo-Australian and Eurasian tectonic plates. It is the **world's highest and largest plateau**, hence called the **'roof of the world'**. The plateau is sufficiently high to **reverse the Hadley cell convection cycles** and drive India's monsoons towards the south.
- It covers most of the Autonomous Tibetan Region, Qinghai Province of Western China, and a part of Ladakh in Jammu and Kashmir. It is surrounded by mountains to the south by the Himalayan Range, north by the **Kunlun Range** and its associated ranges, and to the west by the **Karakoram Range**.
- The Tibetan Plateau, often called the **world's "third pole,"** contains the largest freshwater reserve outside the Arctic and Antarctic polar regions. Several large rivers of Asia originate from Tibet, such as the **Yangtze**, **the Yellow River (Huang He)**, **the Brahmaputra**, etc.

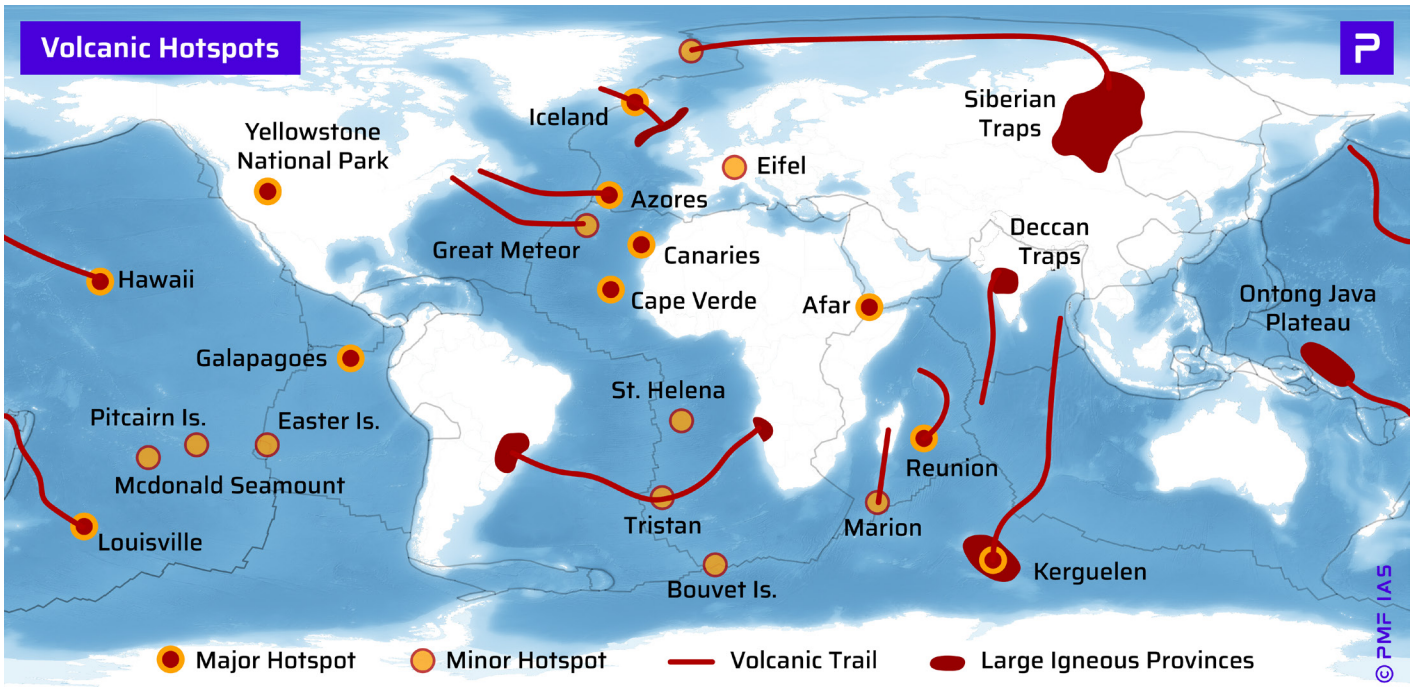
1.5.10. Deccan Plateau

- The Deccan Plateau is a large plateau that forms most of the **southern part of India**. It is bordered by two mountain ranges, the **Western Ghats** and the **Eastern Ghats**.
- The plateau includes the **Deccan Traps**, one of Earth's most significant volcanic features. Made of **multiple basalt layers or lava flows**, the Deccan Traps cover 500,000 square kilometres in area.
- The **Deccan is rich in minerals**. Primary mineral ores in this region are **mica and iron** ore in the **Chota Nagpur region**, and **diamonds**, **gold** and other metals in the **Golconda region**.



1.5.11. Mascarene Plateau

- The Mascarene Plateau is a **submarine plateau (Oceanic plateau)** that extends between the **Seychelles** and **Mauritius Islands** in the Indian Ocean in a crescent form.
- The northern Mascarene Plateau, a remnant of Gondwana, features **granite topped with limestone and basalt** from the Deccan Traps eruption 66 million years ago.
- The southern part, formed by the **Reunion volcanic hotspot**, comprises banks and shoals that were **once volcanic islands**, now mostly submerged or eroded.



1.5.12. Persian Gulf

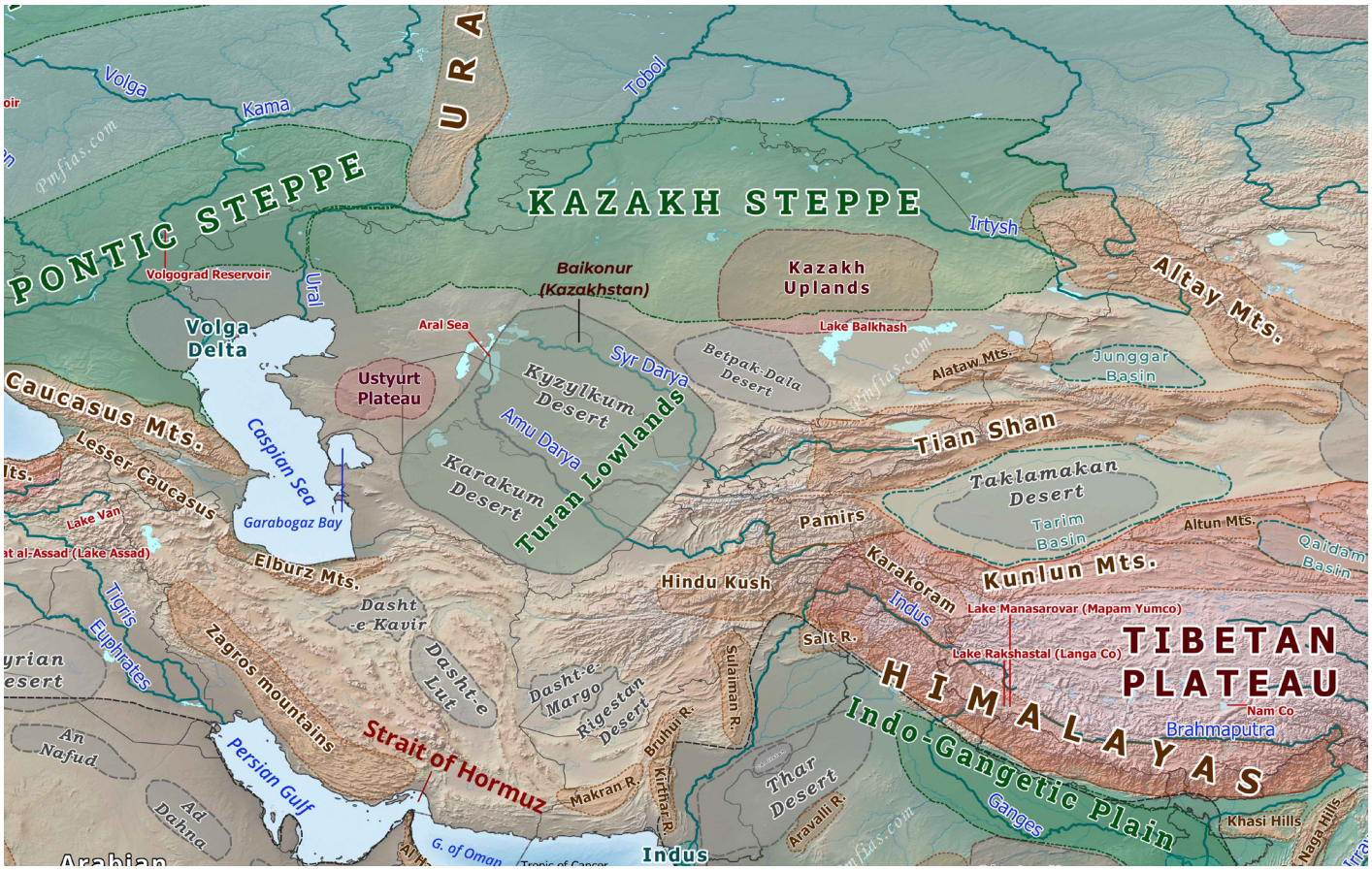
- The Persian Gulf is a **shallow marginal sea** in the Indian Ocean, sandwiched between the Arabian Peninsula and southwestern Iran.
- It is bordered by Iran, Qatar, UAE, Bahrain, Iraq, Kuwait, Oman, and Saudi Arabia (Shortcut: "**IQU BIKOS**" as "**IQ Upar Bhi Kos**" (Boost your IQ as well). It connects to the Indian Ocean via the **Strait of Hormuz**.
- There are several islands (E.g. **Qeshm Island**) located in the Gulf, some formed by **salt domes or plugs**, while others merely accumulate **coral and skeletal debris**.
- The gulf receives sediments via the **Shatt Al-Arab waterway** from the Tigris, Euphrates, Karun rivers, etc.

1.5.13. Sea of Okhotsk

- The Sea of Okhotsk is a northwestern arm of the Pacific Ocean, enclosed almost entirely by Russian territory except for a small area touching the Japanese island of **Hokkaido**. It was formed within the past two million years due to the combined action of repeated glaciation.

1.5.14. Central Asian Region

- Central Asia is a vast region in the **heart of Asia**, stretching from the Caspian Sea in the west to the borders of western China in the east. This region encompasses five countries: **Kazakhstan**, **Uzbekistan**, **Tajikistan**, **Kyrgyzstan**, and **Turkmenistan**.
- The landscape of Central Asia can be **divided into two distinct areas**: the vast **grassy steppes of northern Kazakhstan** and the **Aral Sea drainage basin** in the south.
- Approximately 60% of the region is covered by deserts, with the **Karakum Desert** occupying most of Turkmenistan and the **Kyzylkum Desert** covering a significant portion of western Uzbekistan.


URA
Volga
Kama
Tobol
PONTIC STEPPE
KAZAKH STEPPE
Irtysh
Volgograd Reservoir
Ural
Baikonur (Kazakhstan)
Kazakh Uplands
Altay Mts.
Aral Sea
Lake Balkhash
Volga Delta
Syr Darya
Betpak-Dala Desert
Alataw Mts.
Junggar Basin
Ustyurt Plateau
Kyzylkum Desert
Amu Darya
Caucasus Mts.
Lesser Caucasus
Caspian Sea
Turan Lowlands
Tian Shan
Karakum Desert
Taklamakan Desert
Lake Van
Garabogaz Bay
Pamirs
Tarim Basin
Altun Mts.
Qaidam Basin
Elburz Mts.
Karakoram
Kunlun Mts.
Hindu Kush
Indus
Lake Manasarovar (Mapam Yumco)
Dasht-e-Kavir
Salt R.
Lake Rakshastal (Langa Co)
TIBETAN PLATEAU
Tigris
Euphrates
Zagros mountains
Dasht-e-Lut
Dasht-e-Margo
Sulaiman R.
Nam Co
Rigestan Desert
Bruhui R.
HIMALAYAS
Brahmaputra
An Nafud
Persian Gulf
Strait of Hormuz
Makran R.
Kirthar R.
Thar Desert
Indo-Gangetic Plain
Ad Dahna
Aravalli R.
Ganges
Khasi Hills
G. of Oman
Indus

Volga
Irtysh
Novosibirsk
Tobol
Ural
Astana
Volgograd Reservoir
Volgograd
Don
Baikonur (Kazakhstan)
Kazakhstan
Lake Balkhash
Aral Sea
Syr Darya
Mt. Shkhara (5200)
Almaty
Caspian Sea
Uzbekistan
Amu Darya
Bishkek
Georgia
Tbilisi
Tashkent
Kyrgyzstan
Armenia
Yerevan
Azerbaijan
Baku
Turkmenistan
Lake Van
Garabogaz Bay
Dushanbe
Tajikistan
Ashgabat
Batura Sar (Batura Mustagh I) (7795)
Mazar-e Sharif
K2 (8611)
Mt. Damavand (5610)
Mosul
Irbil
Kirkuk
Tehran
Jalalabad
Nanga Parbat (8125)
Tikrit
Herat
Kabul
Peshawar
Ghazni
Rawalpindi
Lake Rakshastal (Lar
Baghdad
Afghanistan
Lake Manasarovar
Iraq
Iran
Islamabad
Mt. Kailash (6638)
Kandahar
Lahore
Amritsar
Ludhiana
Indus
Euphrates
Tigris

- The **Amu Darya and Syr Darya river systems** originate from mountain ranges in the south and east and travel north-westward through Kyrgyzstan, Tajikistan, eastern Uzbekistan, and Turkmenistan before draining into the **Aral Sea**.
- The eastern and southern boundaries of Central Asia are marked by **high mountain ranges**, including the **western Altai range**, extending into Iran, Afghanistan, and western China.
- **Capitals of Central Asian Countries:**
  - **Kazakhstan:** Astana
  - **Kyrgyzstan:** Bishkek
  - **Tajikistan:** Dushanbe
  - **Turkmenistan:** Ashgabat
  - **Uzbekistan:** Tashkent

[UPSC 2022] Consider the following countries:

1. Azerbaijan
2. Kyrgyzstan
3. Tajikistan
4. Turkmenistan
5. Uzbekistan

Which of the above has borders with Afghanistan?

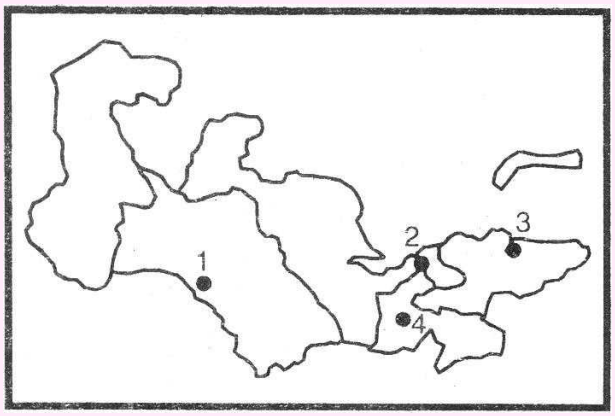
a) 1, 2 and 5 only
b) 1, 2, 3 and 4 only
c) 3, 4 and 5 only
d) 1, 2, 3, 4 and 5

Answer: c) 3, 4 and 5 only

[UPSC 2001] The given map shows four towns of the Central Asian region marked as 1, 2, 3 and 4. Identify these from the following lists and select the correct answer using the codes given below:

Towns:

A. Bishkek
B. Ashikhabad
C. Tashkent
D. Dushanbe



Codes:

a) A-3; B-1; C-2; D-4
b) A-3; B-1; C-4; D-2
c) A-1; B-3; C-2; D-4

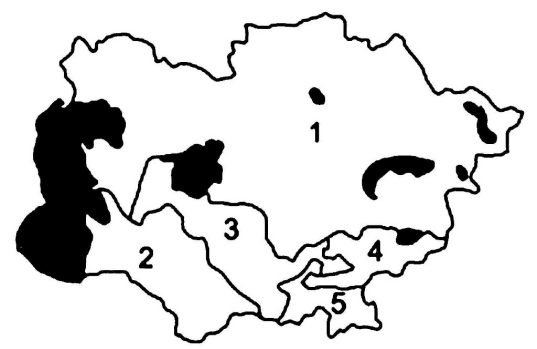
d) A-1; B-3; C-4; D-2

Answer: a) A-3; B-1; C-2; D-4

[UPSC 1995] Given below is a map of some countries which were parts of the erstwhile Soviet Union, with water bodies shown by shaded areas:

The countries marked 1, 2, 3, 4 and 5 are respectively:

a) Tajikistan, Turkmenia, Uzbekistan, Kirgizia, Kazakhstan
b) Turkmenia, Kirgizia, Tajikistan, Uzbekistan, Kazakhstan
c) Kazakhstan, Uzbekistan, Tajikistan, Kirgizia, Turkmenia
d) Kazakhstan, Turkmenia, Uzbekistan, Kirgizia, Tajikistan



Answer: c) Kazakhstan, Uzbekistan, Tajikistan, Kirgizia, Turkmenia

1.5.15. Significant Places/Facts

Hang Son Doong

- Hang Son Doong (meaning "**Mountain River Cave**" in Vietnamese) is in Phong Nha-Ke Bang National Park, Quang Binh Province, **Vietnam**. It is the **largest cave in the world**. It contains massive cave pearls and what are believed to be among the tallest **stalagmites** in the world (up to 70 meters tall)

Burj Khalifa

- Burj Khalifa is the **world's tallest building**, at 2,717 feet (828 meters) in Dubai, UAE. The building serves multiple purposes, housing commercial, residential, and hospitality ventures.
- It is built on a **Y-shaped island plot** created explicitly for the structure, and the Y-shaped plan is designed to **reduce wind forces** on the tower.

Great Wall of China

- The Great Wall of China is an **extensive fortification system**, one of the most significant construction projects (total length: 8,850 km) in history, and a UNESCO World Heritage site. It stretches from **Mount Hu** (Liaoning province) to **Jiayu Pass** (Gansu province).

[UPSC 2022] Which one of the following statements best reflects the issue with the Senkaku Islands, sometimes mentioned in the news?

a) It is generally believed that they are artificial islands made by a country around the South China Sea.
b) China and Japan engage in maritime disputes over these islands in the East China Sea.
c) A permanent American military base has been set up there to help Taiwan to increase its defense capabilities.

d) Though the International Court, of Justice, declared them as no man's land, some Southeast Asian countries claim them.

Explanation

- **Japan** and **China** have been in a **long-running dispute** over the **Senkaku islands** that Beijing calls the Diaoyu. Currently, the Government of Japan control and administer the territory.
- The Senkaku Islands are an uninhabited group of islands situated in the **East China Sea**.
- These islands are strategically located, rich in potential oil and natural gas resources, and situated in prime fishing areas. Control over them impacts military and shipping routes in the region.

Answer: b)

[UPSC 2016] Consider the following pair:

Community sometimes mentioned in the news	***In the affairs of***
1. Kurd	Bangladesh
2. Madhesi	Nepal
3. Rohingya	Myanmar

Which of the pairs given above is/are correctly matched?

a) 1 and 2
b) 2 only
c) 2 and 3
d) 3 only

Answer: c) 2 and 3

[UPSC 2014] Consider the following pairs:

Region	***Country in news***
1. Chechnya	Russian Federation
2. Darfur	Mali
3. Swat Valley	Iraq

Which of the above pairs is/are correctly matched?

a) 1 only
b) 2 and 3 only
c) 1 and 3 only
d) 1, 2 and 3

Explanation

- **Chechnya** is a federal subject (republic) of the Russian Federation. It has been in the news due to conflicts involving separatist movements and terrorism.

- **Darfur** is a region in **western Sudan**, not Mali. It has been in the news for a prolonged humanitarian crisis and conflict between government forces and local groups.
- The **Swat Valley is located in Pakistan**, not Iraq. It gained international attention due to conflicts involving the Taliban and as the home region of Malala Yousafzai, a Nobel Peace Prize laureate.

Answer: a) 1 only

1.6. Recently In The News

1.6.1. Al-Jawf Region

- The Al-Jawf region in **Saudi Arabia** witnessed a historic winter phenomenon, with **snowfall blanketing the desert** for the first time in recorded history.
- The Al-Jawf is one of the most **fertile regions** in Saudi Arabia. Human presence here dates back to the Stone Age. The region is renowned for its **olive cultivation**, boasting the world's largest modern olive farm. During winter, it is one of the coldest regions in Saudi Arabia.

1.6.2. Dagestan Region

- Officially known as the Republic of Dagestan, it is a **southern province** of **Russia**. It is located in the eastern part of the **North Caucasus**, sharing borders with **Georgia** and **Azerbaijan** to the South. It is a predominantly Muslim region with a history of armed insurgency.
- Dagestan's name translates to '**Land of Mountains**, ' emphasising its mountainous terrain.
- **Makhachkala**, along the coast of the Caspian Sea, is the capital of Dagestan.

1.6.3. Gulf of Aden

- India's defence minister indicated a possibility of an increase in threats in the **Gulf of Aden**.
- The Gulf of Aden is between **Yemen** on the south coast of the **Arabian Peninsula** and **Somalia** in Africa.
- The Gulf runs in a west-east direction, roughly 900 kilometres long and 500 kilometres wide. Together with the **Red Sea**, which connects the northwest through the **Bab el-Mandeb**, it forms an **essential oil transport route** between Europe and the Far East.
- When the British military withdrew from the area in the late 1960s, the use of the Gulf was diminished due to the closing of the **Suez Canal**. Egypt renovated and reopened the canal in 1975.
- In recent years, the Gulf has received a lot of attention due to piracy, terrorism, and refugee smuggling.
- According to the **United Nations High Commissioner for Refugees (UNHCR)**, 142 people died in 2023 while crossing the Gulf of Aden from the **Horn of Africa** to the Yemen coast in search of refugee status.

1.6.4. Lake Sapanca

- **Location:** Freshwater lake in Sakarya Province, **Turkiye**, between the Gulf of İzmit and Adapazari Meadow.
- **Geography:** Lies in a **tectonic depression**, running parallel to **Iznik Lake**.

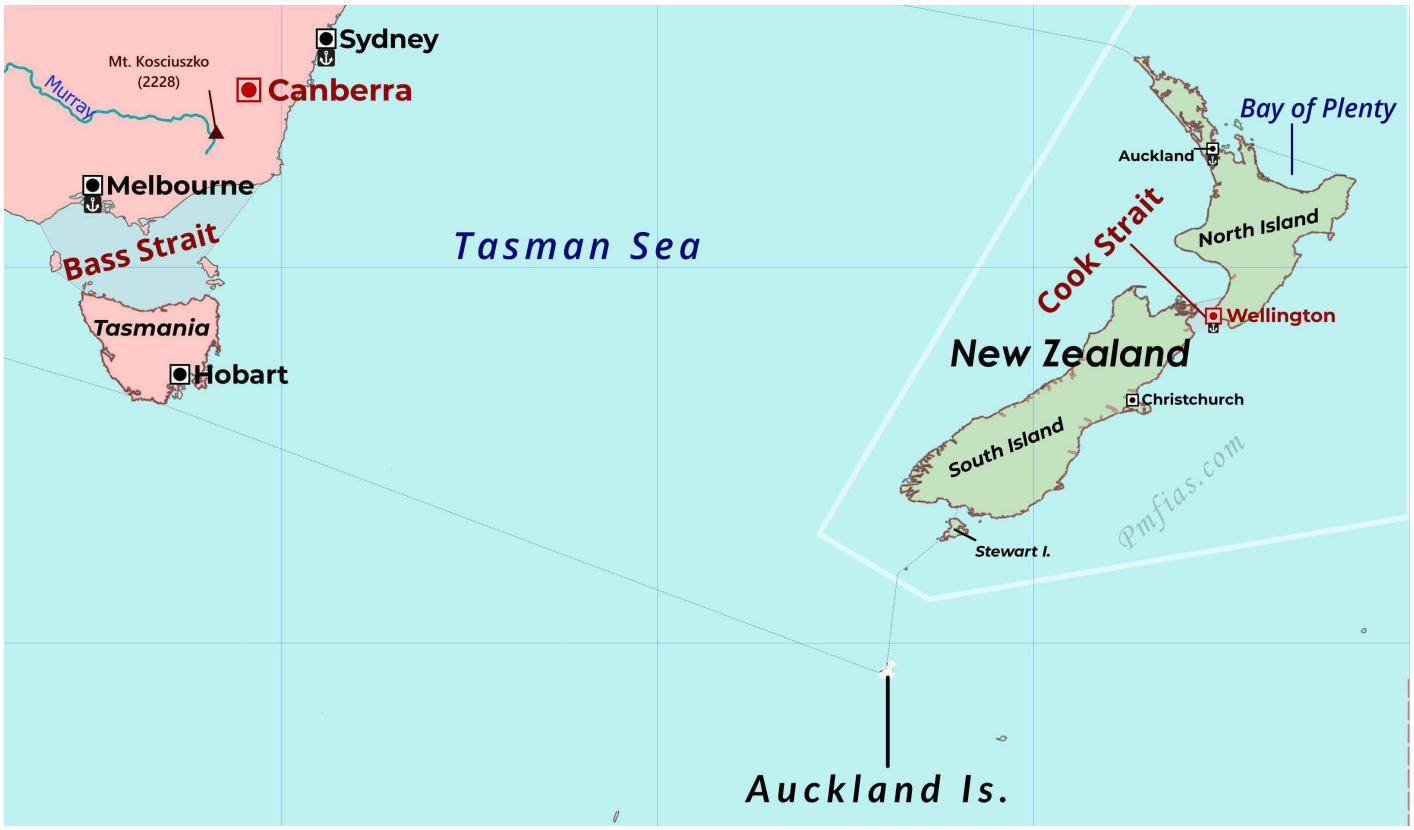
1.6.5. Lebanon

- It borders **Syria** to the north and east and **Israel** to the south. **Cyprus** lies in the west across the **Mediterranean Sea**. It is part of the **Levant region** in the Middle East. It was in the news due to a disputed area called **Shebaa Farms** in **Israeli-occupied Golan Heights**.

1.6.6. Legal Personhood for Mount Taranaki

- New Zealand's **Mount Taranaki** has been granted legal personhood, recognising it as a **living entity** with rights, responsibilities, and powers, in a landmark agreement with **Maori tribes**.

- Mount Taranaki (Taranaki Maunga), also known as **Mount Egmont**, is located on the west coast of New Zealand's **North Island**. It is a **dormant stratovolcano**, often compared to Japan's Mount Fuji.



Maori Connection

- **Taranaki Maunga** holds immense cultural and spiritual significance for the Maori people, particularly for the **eight iwi (tribes)** of the Taranaki region.
- The mountain is viewed as an ancestor, or '**tupuna**,' embodying spiritual and familial ties for the Maori, symbolising their connection to the land and history. It was traditionally considered a **living being**, with the Maori worldview emphasising respect for natural features as integral to their identity.

1.6.7. Mayotte

- **Tropical Cyclone Dikeledi** (Jan 2025) struck **Mayotte**, a **French territory** in the **Indian Ocean**, causing severe flooding and displacing 14,500 people. It followed **Tropical Cyclone Chido** (Dec 2024), the strongest storm in 90 years, which devastated Southeast Africa.
- **Mayotte** is in the **Mozambique Channel**, part of the **Comoros Archipelago** in the Indian Ocean. It comprises two islands: Grande Terre (main island) and Petite Terre.
- **History:** Colonised by France in 1843, Mayotte remained French following a 1974 referendum when the other Comoros islands gained independence.
- **Present Status:** A French overseas department and the poorest territory of France and the EU.

1.6.8. Mt. Lewotobi Laki Laki

- The eruption of **Mount Lewotobi Laki-Laki** in **Indonesia** set off earthquakes, leading to fatalities.

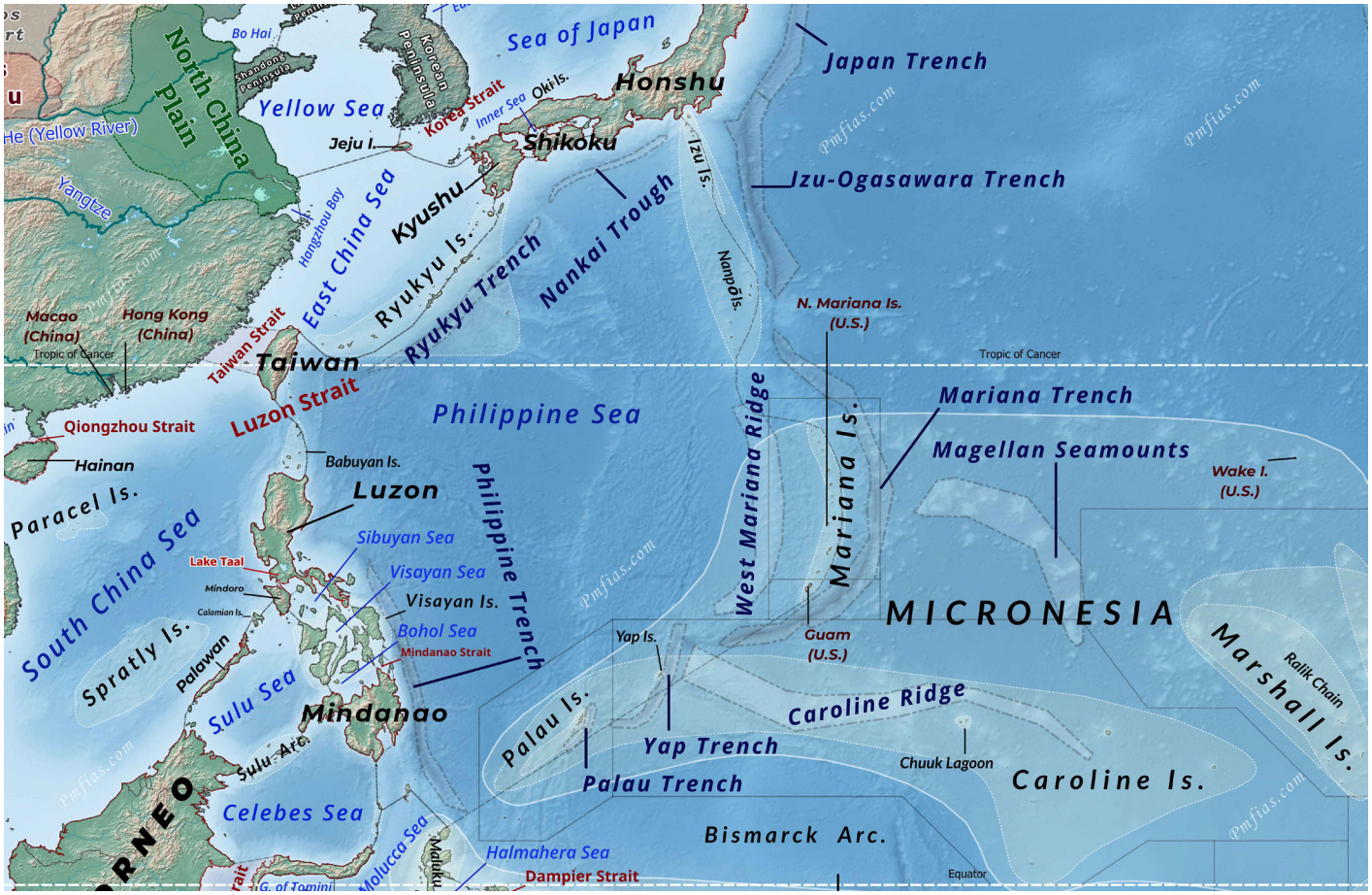
- Mount Lewotobi Laki-Laki is a part of the Lewotobi twin volcanic complex, including Lewotobi Laki-Laki (Male) and Lewotobi Perempuan (Female) stratovolcanoes.

1.6.9. Netzarim Corridor

- Israel has initiated the withdrawal of troops from the **Netzarim Corridor** in **Gaza** as part of a ceasefire agreement with Hamas, marking a key step in the truce implementation.
- The Netzarim corridor is a 7 km east-west passage from the Israeli border to the **Mediterranean**, which holds strategic and military relevance, separating **Gaza City** from the rest of the Gaza Strip.
- **Strategic Location:** Bisects northern and southern Gaza. Historically restricted Palestinian movement.

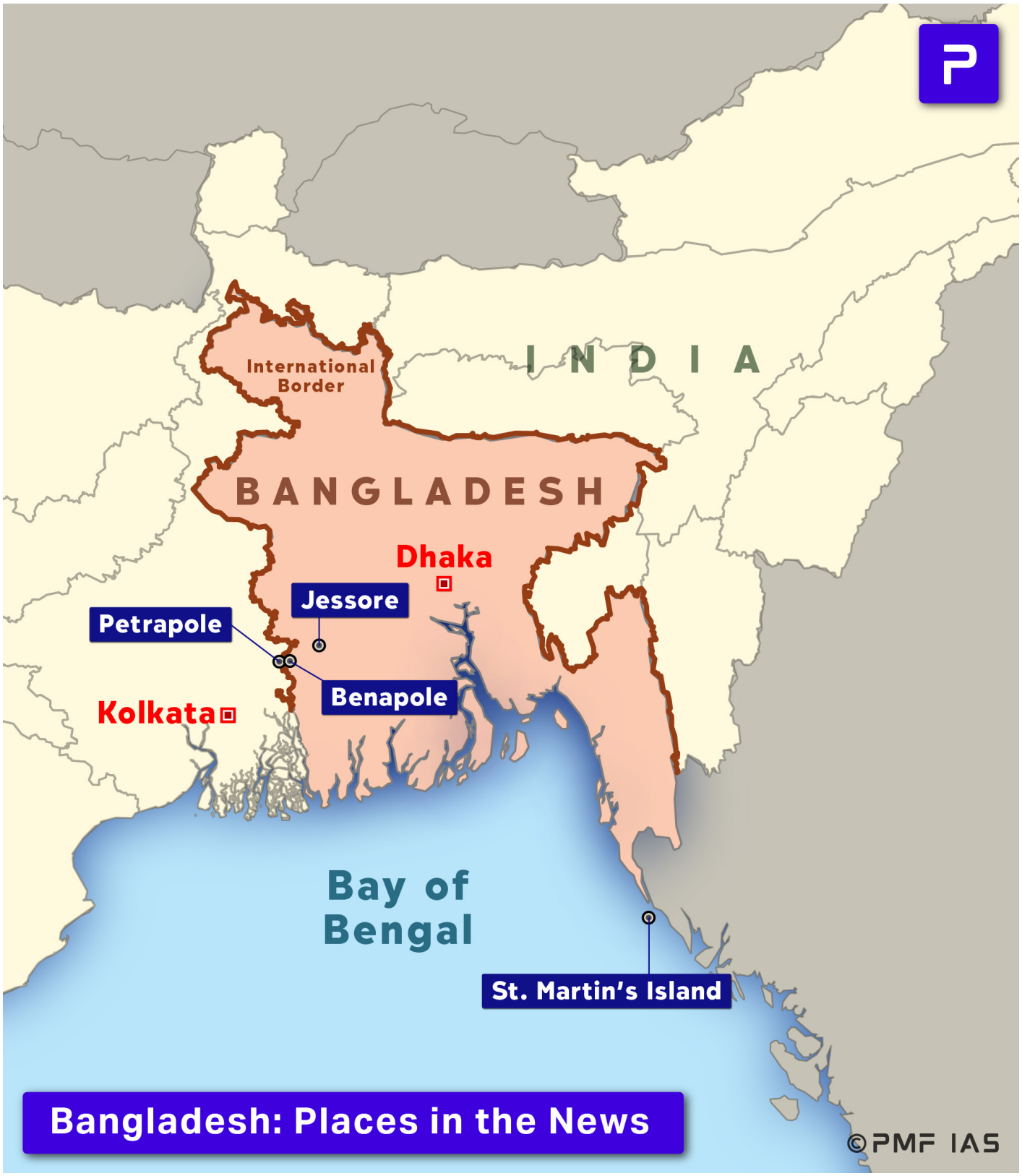
1.6.10. Pacific Island of Saipan

- Saipan Island, located in the **western Pacific Ocean**, is the capital of the **Northern Mariana Islands**. Like territories such as **Guam** or **Puerto Rico**, the Northern Mariana Islands are part of the US without the complete status of a state. The US took control of the island from Japan in WWII. It was a key battleground between U.S. and Japanese forces in the Battle of Saipan in 1944.



1.6.11. Saint Martin Island

- **Saint Martin Island** is **Bangladesh's sole coral reef island** and lies in the southernmost part of Bangladesh. It is also known as "**Narikel Zinzira**" (Coconut Island) or "**Daruchini Dwip**" (Cinnamon Island). It was originally a part of the **Teknaf peninsula** but was separated due to the submergence of a portion.



1.6.12. Solomon Islands

- Scientists discovered the **world's largest coral colony** in the Solomon Islands.
- Solomon Islands is located in the **southwestern Pacific Ocean**, forming two parallel chains of volcanic islands and coral atolls. It is an **archipelago nation** with six major islands and over 900 smaller ones.

- **Nearest neighbours:** **Vanuatu** to the southeast and **Papua New Guinea** to the west.
- **Independence:** It was a British protectorate until independence as a republic in 1978.
- **Growing Chinese Influence:** In 2019, the Solomon Islands decided to sever its diplomatic ties with **Taiwan** and establish formal relations with China. **Kiribati** dropped Taiwan to establish a relationship with China, the same month the Solomon Islands did; **Nauru** followed suit in January 2024.

1.6.13. Three Gorges Dam

- The **Three Gorges Dam** on the **Yangtze River** near Yichang in **Hubei Province**, **China**, is the **world's largest dam structure**.
- The Yangtze River frequently experiences flooding. It experienced a second flood in 2024 as the water in the **Three Gorges Dam** rose to record levels.
- Construction of the dam began in 1994 and was completed in 2006. It is a **straight-crested concrete gravity structure**. It is one of China's most ambitious engineering projects, designed for **hydroelectric power generation**, **flood control**, and improved navigation.

---------- End of Chapter ----------

2. Africa

Area	• 30.3 million km^2 (6% of Earth's total surface area and 20% of its land area) • **Second-largest continent** in the world (both in area and population). • The majority of the continent and its countries are in the **Northern Hemisphere**.
Countries	• A total of 54 and 9 dependent territories • **<u>Largest countries:</u> Algeria**, **Democratic Republic of the Congo (DRC)**, Sudan, Libya and Chad. • **<u>Smallest countries:</u> Seychelles**, São Tomé and Príncipe, Mauritius, Comoros.

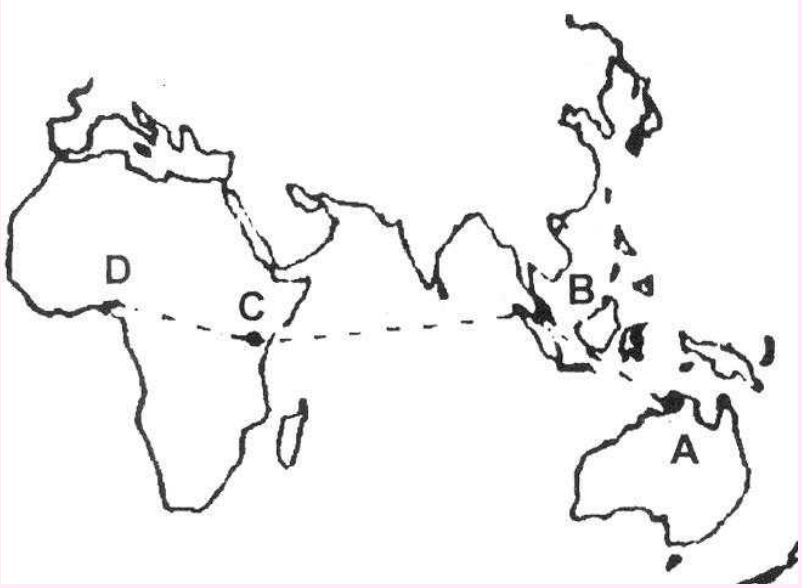
	• **Smallest countries in mainland Africa:** **Gambia**, **Eswatini (Swaziland)**, Djibouti, Rwanda and Burundi.
Population	• 1.4 billion • **Largest countries by population:** **Nigeria**, **Ethiopia**, **Egypt**, Democratic Republic of the Congo and Tanzania. • Africa's average population (19 years) is the **youngest among the continents**.
Longitudinal Extent of the Mainland	• 51° E to 17° W (~7,400 km — **Ras Hafun in Somalia** to **Cape-Vert in Senegal**)
Latitudinal Extent of the Mainland	• 37° N to 34° S (~8,000 km — **Ras ben Sakka in Tunisia** to **Cape Agulhas** in South Africa)
Coastline	• The coastline of Africa is **30,500 km** in length. • Madagascar has the longest coastline in Africa (~4,800 km) • **Africa's coastline is shorter than Europe's** (38,000 km) because there are few inlets and few large bays or gulfs.
Major Cities	• **Largest by Area (Urban agglomeration):** **Cairo (Egypt)**, Lagos (Nigeria), Kinshasa (DRC). • **Largest by Population:** **Lagos (Nigeria)**, **Kinshasa (DRC) and** Cairo (Egypt) • **Pietermaritzburg:** On **7 June 1893**, young Mahatma Gandhi was thrown off a train at **Pietermaritzburg** station. • **Addis Ababa (Ethiopia):** Headquarters of the African Union.
Major Islands/Island groups	• **Madagascar** (the largest island in Africa and the 4th largest in the world), Comoros, Seychelles, Mauritius, **Reunion (an overseas territory of France)**, Cape Verde Islands, Canary Islands (Spain), São Tomé and Príncipe and Madeira Islands (Portugal).
Major Lakes	• **Largest lakes by surface area in Africa**: 1) **Lake Victoria** (the second widest freshwater body in the world), 2) **Lake Tanganyika**, 3) Lake Malawi (all freshwater lakes) • **Largest lakes by volume in Africa:** 1) **Lake Tanganyika**, 2) Lake Malawi, 3) Lake Victoria • **Deepest lake in Africa**: 1) **Lake Tanganyika (second deepest lake in the world**; **Lake Baikal in Russia is the deepest lake**) and 2) **Lake Malawi**
Highest Mountains	1. **Mount Kilimanjaro (5895 m) — Tanzania** 2. Mount Kenya (5199 m)
Longest Rivers	1. **Nile River** (~6650 km) 2. Congo River (~4,700 km) 3. Niger River (~4,200 km)

	4. Zambezi River (~2,500 km)
Landlocked Countries	**16:** Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, **Eswatini (former Swaziland)**, **Lesotho**, Malawi, Mali, Niger, Rwanda, South Sudan, Uganda, Zambia and Zimbabwe. **Enclaves: territories entirely surrounded by another state's territory**. 1. **San Marino:** An independent country completely enclosed by Italy. 2. **Vatican City:** It is entirely surrounded by Rome, Italy. 3. **Lesotho:** A country surrounded by South Africa.
Facts	• Africa is the only continent extending from the **northern to the southern temperate zone**. • Over half of the African continent is dominated by **grasslands** or **savannahs**. • Africa produces ~95% of the world's diamonds and ~50% of the world's gold. It has 90% of the world's platinum reserves. • Africa is often called the "**Cradle of Humankind**" due to the discovery of numerous fossils and tools indicating it as the origin of early **Homo sapiens**, our species. • It is the **only continent** crossed by both the **Tropic of Cancer** and the **Tropic of Capricorn**. • Around 95% of **Madagascar's** reptiles, 89% of its plants, and 92% of its mammals are found exclusively on the island (**endemic**).

[UPSC 1999] Match the cities labelled as A, B, C and D in the given map with the names of cities and select the correct answer using the codes given below the names of cities:

Name of cities

1. Darwin
2. Kuala Lumpur
3. Lagos
4. Nairobi
5. Singapore

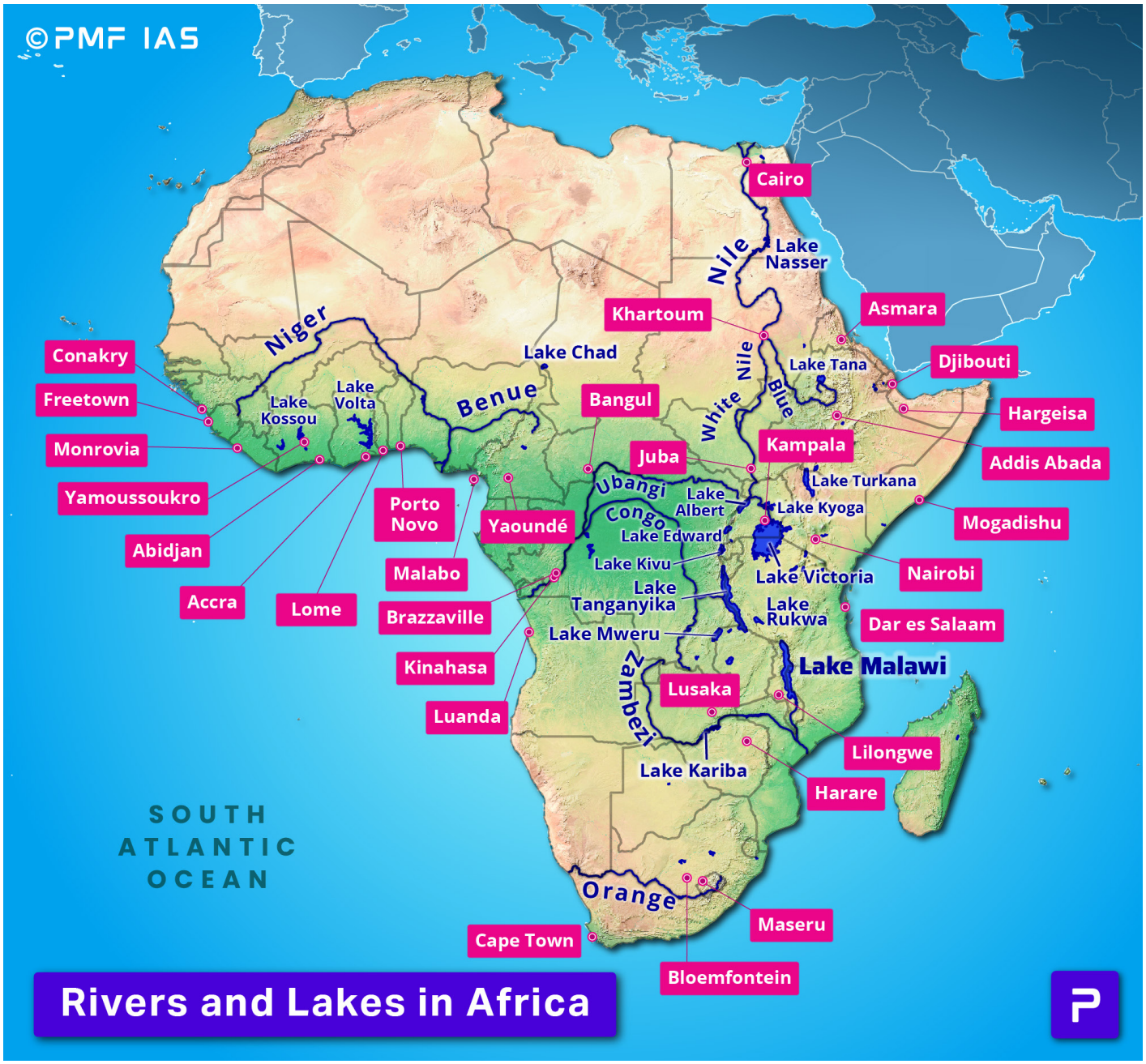


Codes:

a) A-1; B-2; C-4; D-3
b) A-2; B-1; C-4; D-3
c) A-1; B-4; C-5; D-2
d) A-4; B-3; C-5; D-2

Answer: a) A-1; B-2; C-4; D-3

2.1. Major Rivers of Africa



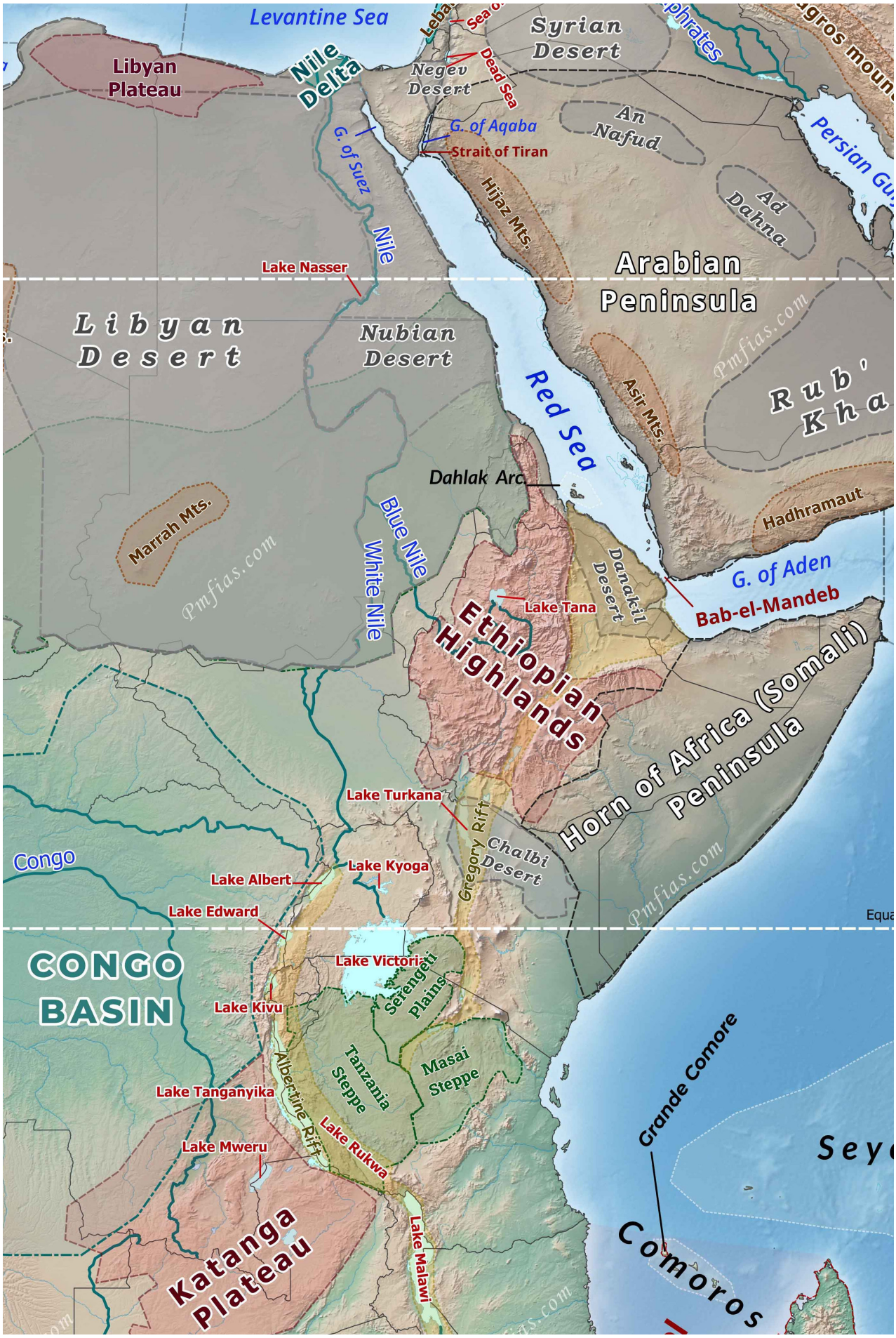
2.1.1. Nile River

- The Nile River (~6,600 km) flows from **south to north** (Russian rivers **Lena River** – 4,294 km, **Ob River** – 3,700 km and **Yenisey River** – 3,487 km are other major south-to-north flowing rivers of the world).
- It is the **world's longest river**, running from Lake Victoria to the Mediterranean Sea.
- It forms an **arcuate delta** (triangular or fan shape).

Source	• Confluence of the White Nile and the Blue Nile at **Khartoum**, **Sudan**.
Mouth	• **Mediterranean Sea** – **Nile Delta**, **Egypt**.
Drainage Basin Countries	• Tanzania, Uganda, Rwanda, Burundi, the Democratic Republic of the Congo, Kenya, Ethiopia, Eritrea, South Sudan, the Republic of Sudan, and Egypt.

Main Tributaries	• The **White Nile**, the **Blue Nile**, and the **Atbarah**.
Important Cities	• **Khartoum**, Atbara, **Cairo**
Important Dams/Reservoirs	• **Lake Nasser** (Aswan High Dam)

Sea of Crete
Crete
Rhodes
Cyprus
N. Cyprus
Nicosia
U.N. Buffer Zone
Akrotiri (U.K.)
Dhekelia (U.K.)
Levantine Sea
Aleppo
Lake Assad
Syria
Mosul
Irbil
Kirkuk
Tikrit
Baghdad
Euphrates
Tigris
Iraq
Beirut
Lebanon
Damascus
Nazareth
Haifa
Sea of Galilee
Ramallah
Amman
Palestine
Jerusalem
Tel Aviv-Yafo
Gaza
Jordan
Israel
Dead Sea
Benghazi
Alexandria
Cairo
El Giza
Suez
G. of Suez
G. of Aqaba
Strait of Tiran
Kuwait
Bahrain
Riyadh
Medina
Tropic of Cancer
Egypt
Nile
Lake Nasser
Saudi Arabia
Jeddah
Makkah
Red Sea
Dahlak Arc.
Eritrea
Asmara
Sanaa
Yemen
Bab-el-Mandeb
Khartoum
Blue Nile
White Nile
Sudan
Lake Tana
Djibouti
G. of Aden
Somaliland
Hargeysa
Addis Ababa
Ethiopia
South Sudan
Juba
Somalia
Mogadishu
Bangui
Lake Turkana
Uganda
Kenya
Congo
Lake Albert
Lake Kyoga
Mt. Stanley (4979)
Kampala
Mt. Kenya (5199)
Lake Edward
Lake Victoria
Nairobi
Lake Kivu
Kigali
Rwanda
Bujumbura
Burundi
Mt. Kilimanjaro (5895)
Mombasa
Dem. Rep. Congo
Tanzania
Lake Tanganyika
Dar es Salaam
30°
20°
40°
50°


Levantine Sea
Libyan Plateau
Nile Delta
Syrian Desert
Negev Desert
Dead Sea
G. of Aqaba
Strait of Tiran
G. of Suez
Nile
An Nafud
Persian Gu
Hijaz Mts.
Ad Dahna
Arabian Peninsula
Lake Nasser
Libyan Desert
Nubian Desert
Red Sea
Asir Mts.
Rub' Kha
Dahlak Arc
Hadhramaut
Marrah Mts.
Blue Nile
White Nile
Danakil Desert
G. of Aden
Bab-el-Mandeb
Lake Tana
Ethiopian Highlands
Horn of Africa (Somali) Peninsula
Lake Turkana
Gregory Rift
Chalbi Desert
Congo
Lake Kyoga
Lake Albert
Lake Edward
CONGO BASIN
Lake Victoria
Serengeti Plains
Lake Kivu
Tanzania Steppe
Masai Steppe
Albertine Rift
Lake Tanganyika
Lake Rukwa
Lake Mweru
Grande Comore
Comoros
Lake Malawi
Katanga Plateau
Pmfias.com

White Nile

- The White Nile is the headwaters and **primary stream of the Nile** itself. It is called the White Nile because of the **white-coloured nature of the clay sediments**.

Source	• **Lake Victoria**, Uganda.
Mouth	• Nile River (confluence with Blue Nile) at Khartoum.
Drainage Basin Countries	• DRC, Rwanda, South Sudan, Sudan, Tanzania, and Uganda.
Main Tributaries	• **Albert Nile**, Bahr el Ghazal, and Sobar River.
Important Cities	• Jinja (Uganda), Juba (South Sudan), **Khartoum** (Sudan)
Important Dams/Reservoirs	• Lake No (South Sudan)

Kagera River

- The **Kagera River** rises near the northern tip of **Lake Tanganyika**, **in Burundi** and flows into **Lake Victoria** and is a significant feeder river. Hence, the length of the Nile is sometimes considered from its headwaters.

Stretches of the White Nile River	Name
From Lake Victoria to Lake Albert	**Victoria Nile**
From Lake Albert to the South Sudan border	**Albert Nile**
From the South Sudan border to Lake No	**Mountain Nile** or Bahr-al-Jabal

Blue Nile

- The Blue Nile is the **most significant tributary** of the Nile. Though **shorter than the White Nile**, **~60% of the water** that reaches Egypt is from the Blue Nile.

Source	• **Lake Tana**, **Ethiopia**.
Mouth	• Nile River (confluence with White Nile) at Khartoum.
Drainage Basin Countries	• Ethiopia and Sudan.
Main Tributaries	• Dinder River and Rahad River.
Important Cities	• Al-Damazin Wad Madani in Sudan.
Important Dams/Reservoirs	• Sennar Dam (Sudan)

Atbarah River

- It rises in **northwest Ethiopia**, approximately 50 km north of Lake Tana. It joins the Nile as its **last tributary at Atbarah town** in Sudan.

Aswan High Dam

- The **Aswan High Dam** is an embankment dam built across the Nile in Egypt between 1960 and 1970. It significantly affects Egypt's economy through irrigation, hydropower, and **flood control**.
- **Lake Nasser** is a man-made lake formed by the construction of the Aswan Dam.

Grand Ethiopian Renaissance Dam (GERD)

- It is a **gravity dam** constructed across the **Blue Nile River** in Ethiopia. It is **Africa's largest dam**. Including the **Aswan High Dam** in Egypt, **two of the world's largest dams** are now on the **Nile River** system in two countries.
- The GERD reservoir, situated in a deep gorge, minimises water loss to evaporation due to its **small surface area relative to volume**. Its capacity is double that of **Lake Mead** (a reservoir formed by the **Hoover Dam** on the **Colorado River** in the Southwestern United States). **(Aswan High Dam** has a capacity four times greater than Lake Mead).

Issues

- Egypt has been in **virtual control of the Nile** water for centuries. **Egypt takes 66% of the Nile's water**, **Sudan 22%**, and Ethiopia barely uses it despite its large contribution. Ethiopia's GERD project (**Africa's largest hydroelectric dam**) has created new regional tensions.
- GRED's primary purpose is electricity production to relieve Ethiopia's acute energy shortage and export electricity to neighbouring countries. Egypt lies downstream, and the dam would jeopardise the food and water security and the livelihoods of ordinary Egyptian citizens.
- Sudan, too, is concerned that if Ethiopia were to gain control over the river, it would affect the water levels Sudan receives. However, **Sudan is likely to benefit from the power generated by the dam**. The river's regulated flow will save Sudan from serious flooding in August and September. Thus, it has proposed joint management of the dam.
- Recently, **Egypt and Sudan** urged the UN Security Council to undertake **"preventive diplomacy" and** call for a legally binding agreement to resolve a **dispute with Ethiopia over water availability** from its dam on the Nile River. Still, Ethiopia insisted the African Union could solve the matter, and many council members agreed.

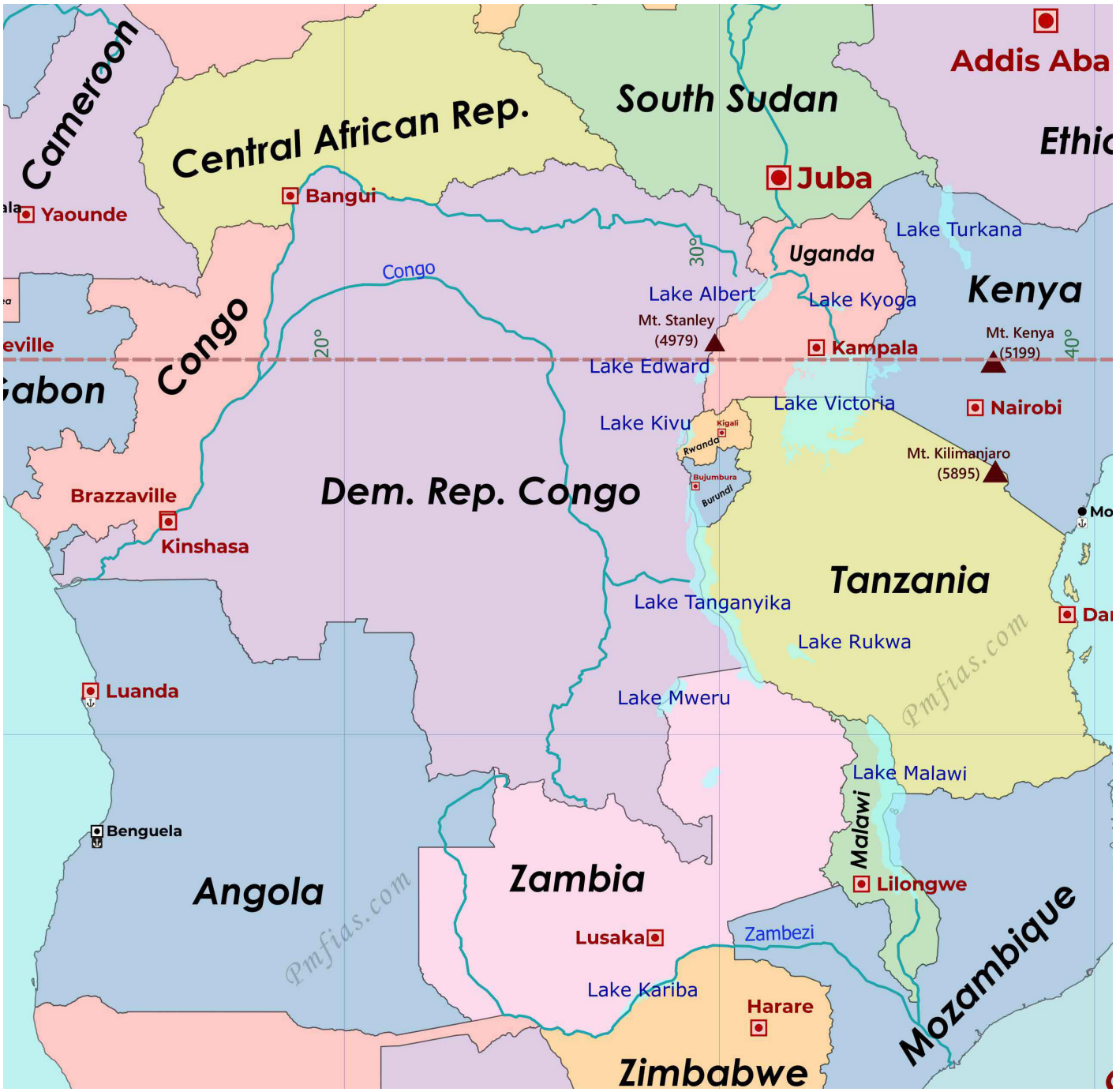
2.1.2. Congo River (formerly Zaire River)

- Congo River (4,700 km) is **Africa's second longest river**, after the Nile, and the largest river in **Western Central Africa**. It is the only major river in the world that **crosses the equator twice**.

Source	• Highlands of Zambia between **Lake Tanganyika** and **Lake Malawi**.
Mouth	• **Atlantic Ocean** — at **Banane**, **DRC**.
Drainage Basin Countries	• DRC, the Republic of the Congo, the Central African Republic, Cameroon, Zambia, Angola, and Tanzania
Main Tributaries	• Ubangi, Sangha, and **Kasai**.
Important Cities	• **Kinshasa** (capital of the **DRC**) is on the left bank • **Brazzaville** (capital of the **Republic of the Congo**) is on the right bank

- The Congo River ranks second globally in terms of its **annual mean daily freshwater discharge**. It is also the second-largest exporter of terrestrial organic carbon into the oceans.
- The **Congo Plume** in the Atlantic receives water and sediment from the Congo River, serving as **one of the world's largest carbon sinks**.

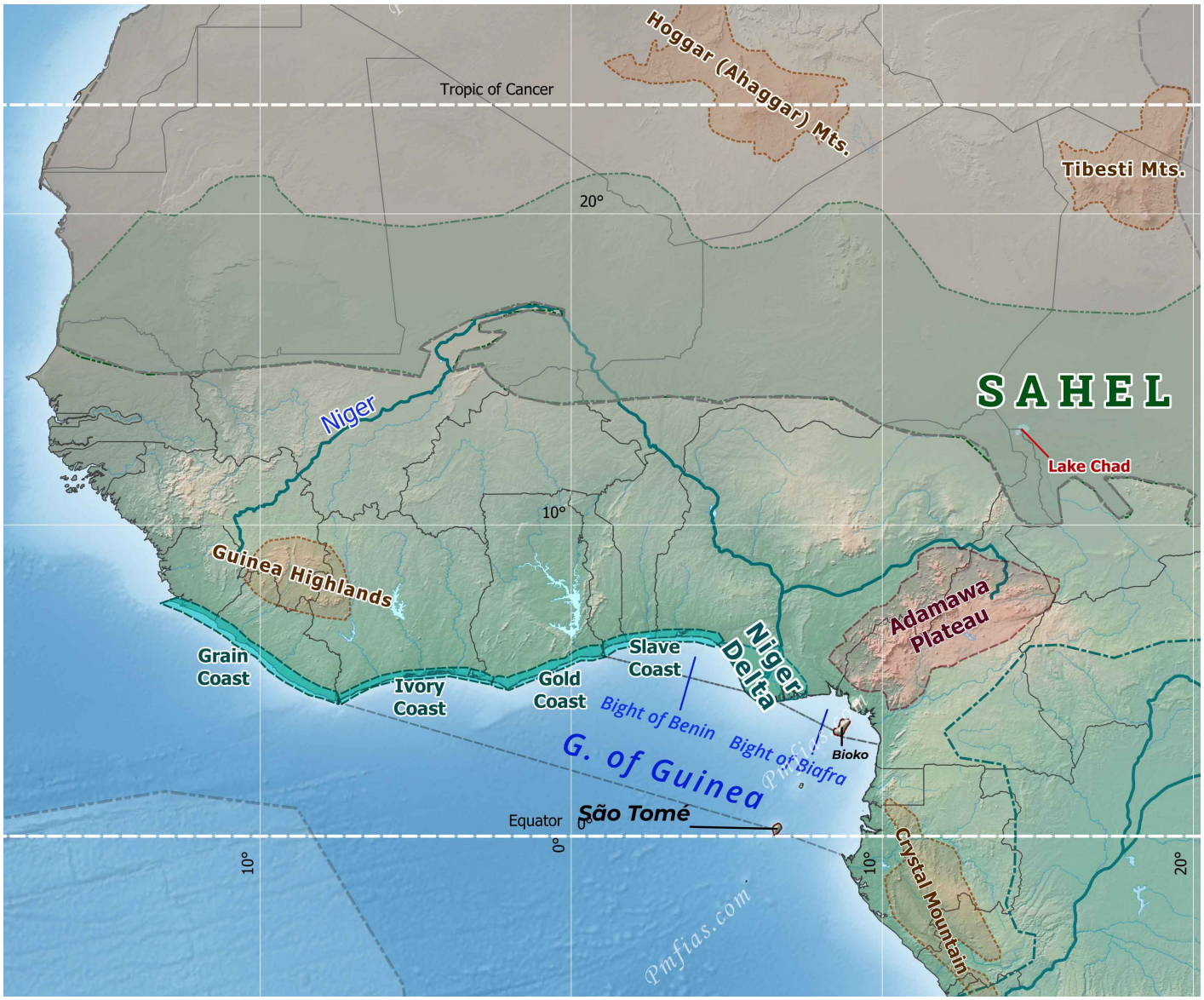
- Flowing through the **second-largest rainforest globally (the largest is the Amazon)**, the Congo Basin is known as the "**lungs of Africa**."



[UPSC 2023] Which one of the following is a part of the Congo Basin?

a) Cameroon
b) Nigeria
c) South Sudan
d) Uganda

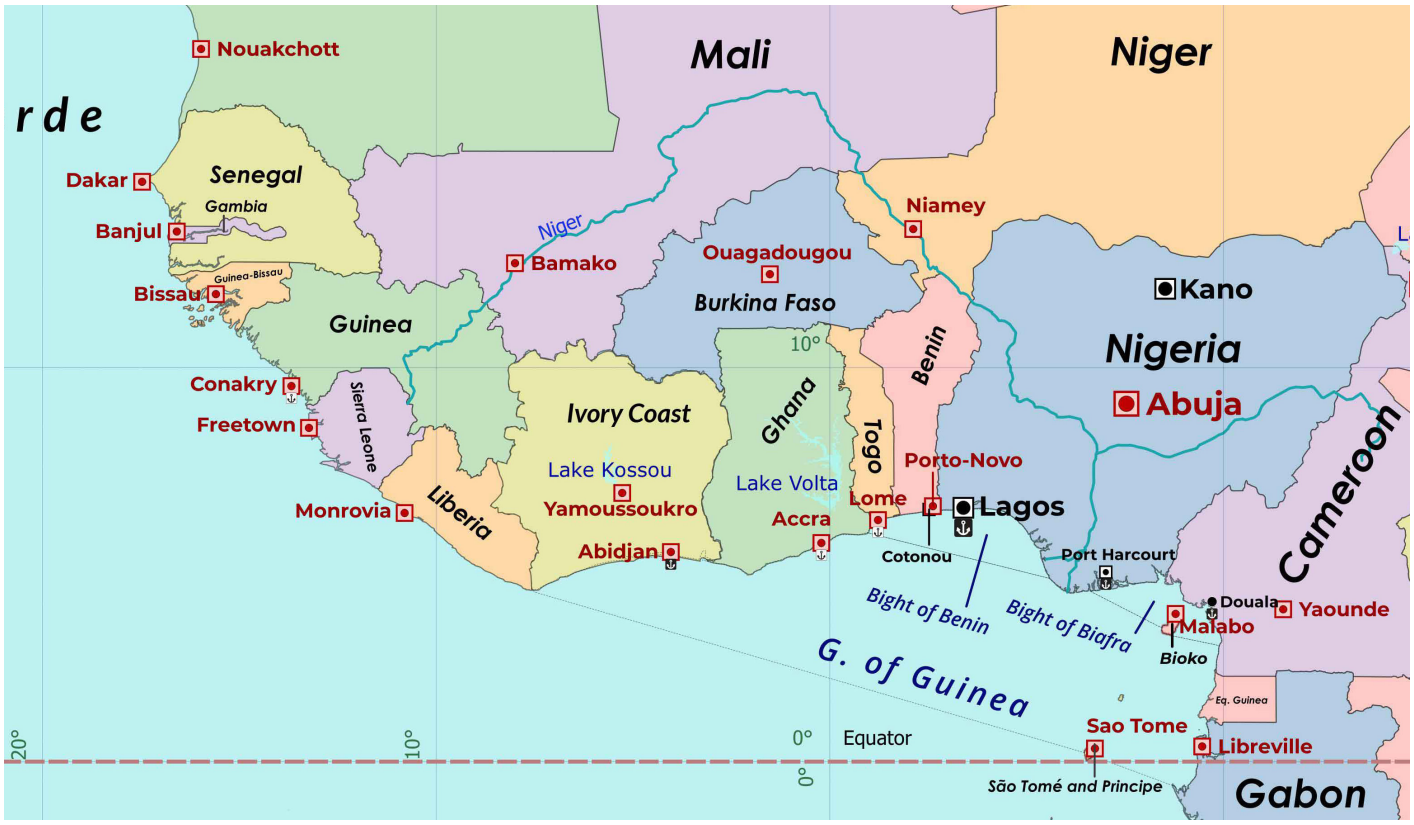
Answer: a) Cameroon



2.1.3. Niger River

- Niger River (4,200 km) is the **third longest river in Africa**, after the Nile and the Congo. It covers the parts of West and Central Africa.
- Niger delta is the **Africa's largest delta**.

Source	• It rises from the **Guinea Highlands** in southeastern Guinea.
Mouth	• **Gulf of Guinea**
Drainage Basin Countries	• Niger River traverses four countries. • **<u>9 basin countries:</u>** Benin, Burkina Faso, Cameroon, Chad, Ivory Coast, Guinea, Mali, Niger, and Nigeria.
Main Tributaries	• Mofu, Milo, Bani, Kaduna, Benue, etc.
Important Cities	• **Bamako** (capital of Mali) and **Mopti** (capital of Niger).
Important Dams/Reservoirs	• **Kainji Dam** (Nigeria)



2.1.4. Zambezi River

- The Zambezi is the **fourth-longest river in Africa** and the longest east-flowing river in Africa. It is southern Africa's longest transboundary river.

Source	• **Kalena Hills** in northwestern Zambia
Mouth	• **Mozambique Channel**
Drainage Basin Countries	• **<u>8 basin countries:</u>** Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe.
Important Cities	• **Lusaka** (capital of Zambia) and Tete (Mozambique).
Important Dams/Reservoirs	• The **Kariba Dam**, located on the border of Zambia and Zimbabwe, forms **Lake Kariba**, the **world's largest reservoir by volume**. • **Cahora Bassa Dam**, Mozambique.

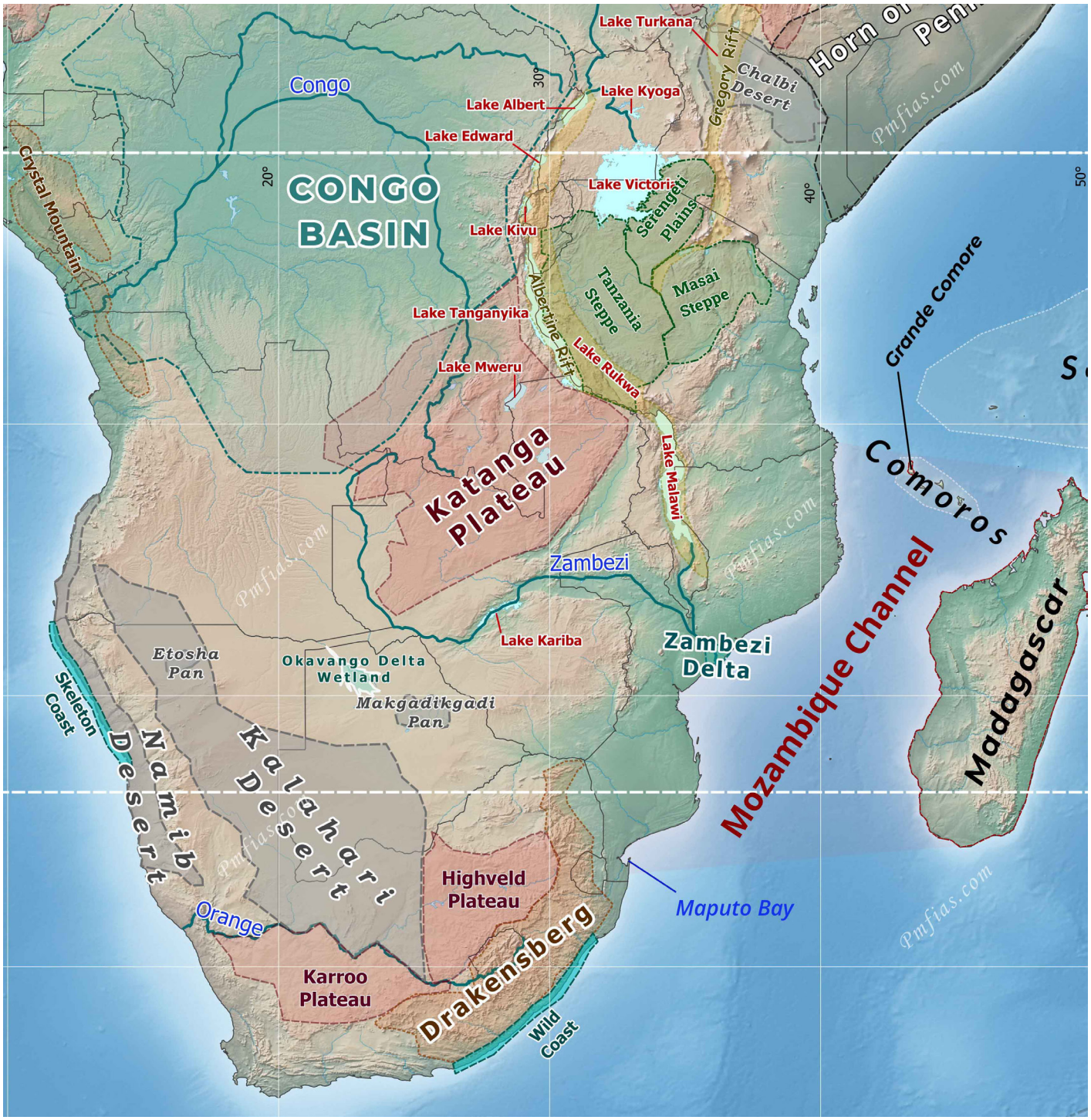
[UPSC 2003] The waterfall 'Victoria' is associated with the river:

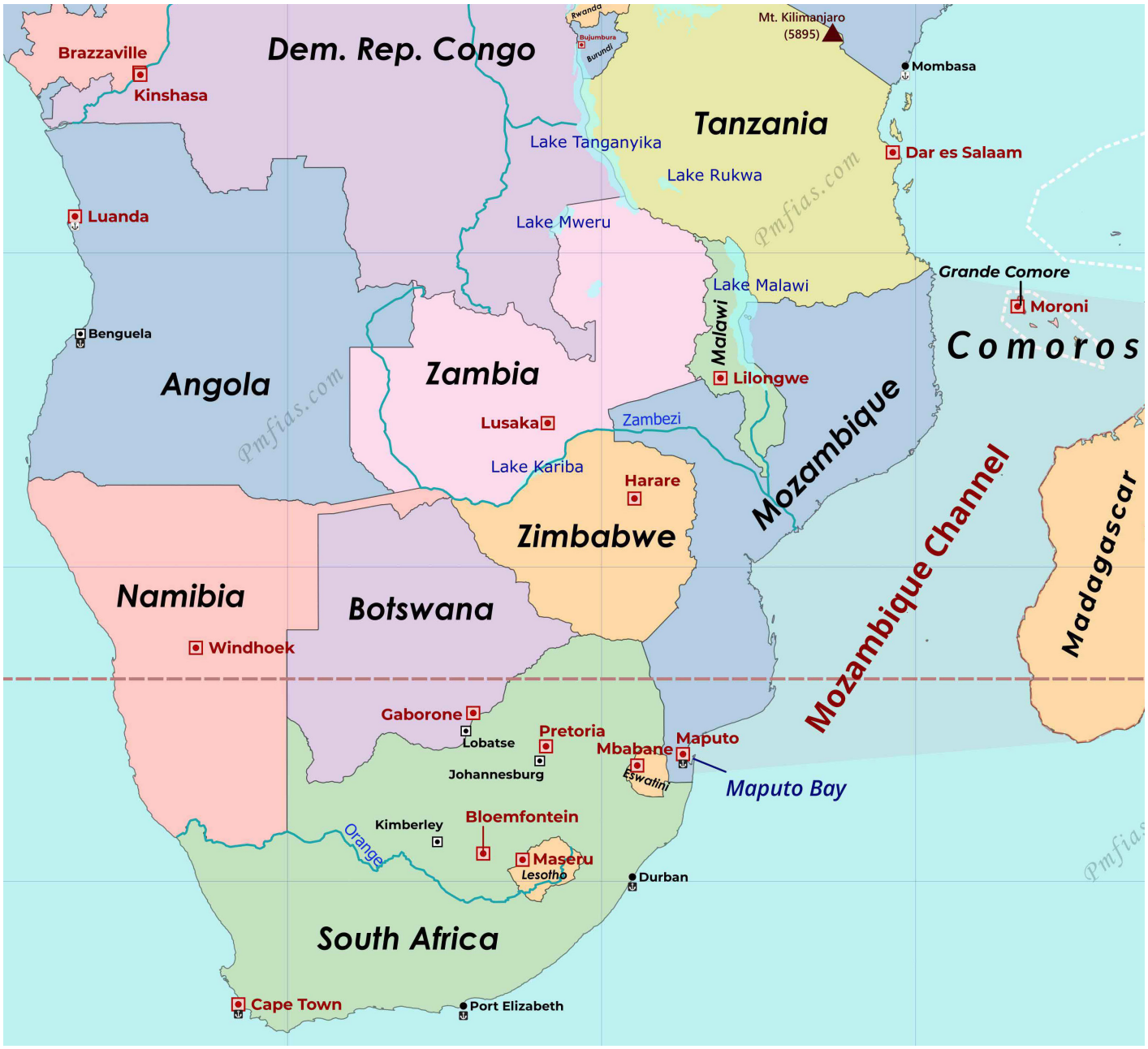
a) Amazon
b) Missouri
c) St. Lawrence
d) Zambezi

Answer: d) Zambezi

Victoria Falls

- Victoria Falls is located on the border between **Zambia** and **Zimbabwe**. It was created by the erosion of a rift in the Zambezi River caused by tectonic activity.
- It is considered **one of the world's largest waterfalls** due to its width of 1,708 meters. It is a **UNESCO World Heritage Site**.
- The falls create a **constant spray and mist**, which can be seen from miles away, earning it the local name **"Mosi-oa-Tunya" (The Smoke That Thunders)**.





2.1.5. Orange River

- The Orange River is a river in **Southern Africa** and is the longest river within the borders of South Africa.

Source	• **Drakensberg mountains** in **Lesotho**.
Mouth	• **Atlantic Ocean** – near **Alexander Bay**, **South Africa**.
Drainage Basin Countries	• **4 basin countries:** South Africa, Namibia, Botswana and Lesotho.
Important Cities	• Upington (South Africa), Noordoewer (Namibia), etc..

2.2. Great Rift Valley

- The Great Rift Valley is an **active continental rift zone** that runs for ~6,400 km from **northern Syria (Asia)** to **central Mozambique (East Africa)**. It is formed due to the divergence of the **tectonic plates**, which results in the formation of various geological features, such as lakes, volcanoes, and rivers.

- The whole system is divided into various parts and occupied by the **Jordan River**, the **Dead Sea** and the **Gulf of Aqaba** in the north, followed by the **Red Sea**. It further continues as the **East African Rift Valley** on the African continent.

Jordan Rift Valley	• Forms the **northern part** of the Great Rift Valley system. • It forms the Jordan River, which continues south through the Jordan Valley into the **Dead Sea** on the Israeli-Jordanian border.
Red Sea Rift	• Millions of years ago, seafloor spreading caused the Arabian and African plates to drift apart, creating the **Red Sea**. • From the **Dead Sea** southward, the Rift is occupied by the **Gulf of Aqaba** and the **Red Sea**. Eventually, it will separate Africa and Asia and connect the Mediterranean and Red Seas.

- The **Gulf of Aden** is an **eastward continuation of the rift**, and from this point, the rift extends southeast-ward as part of the mid-oceanic ridge of the Indian Ocean.

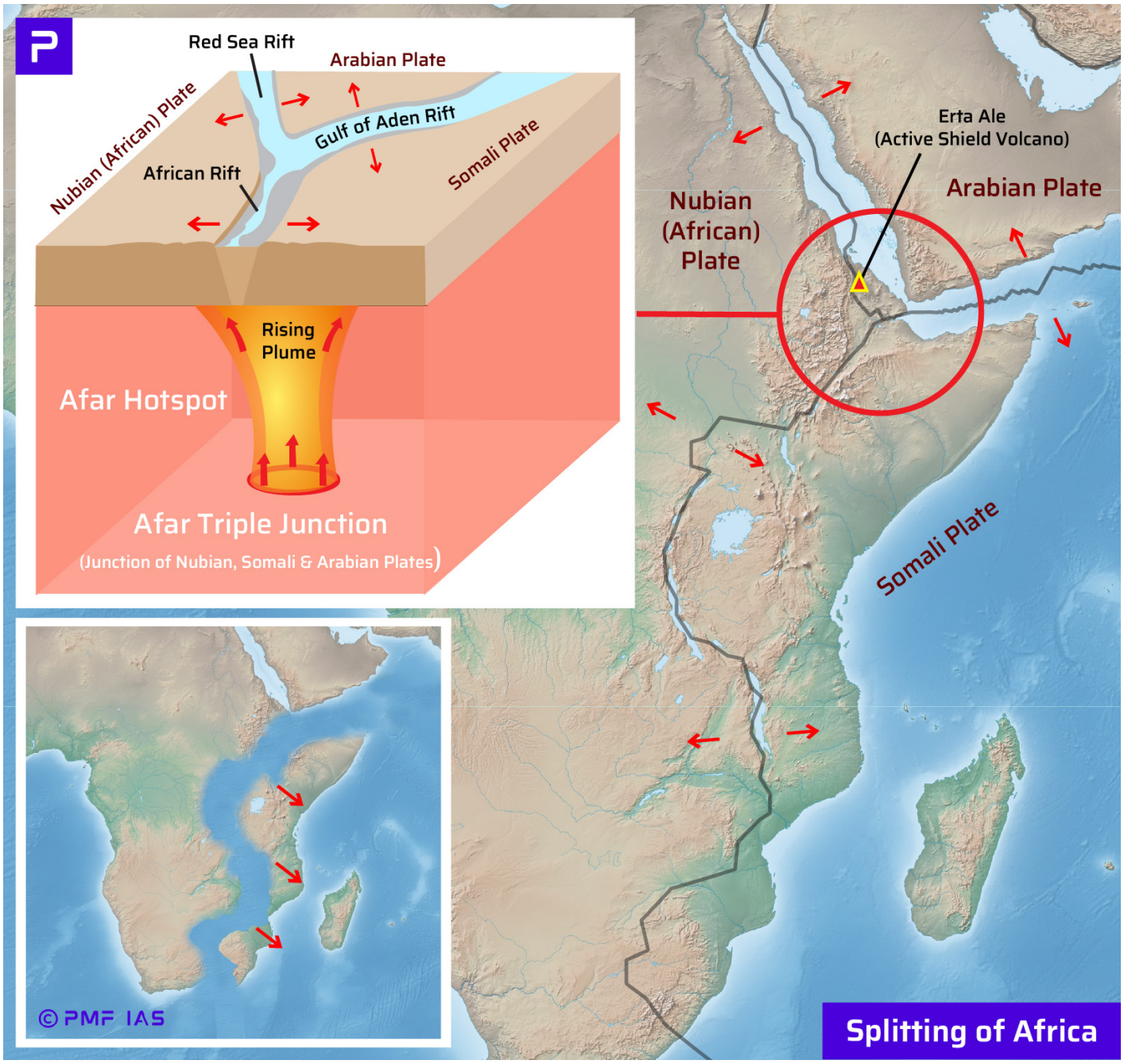
2.2.1. East African Rift Valley

- In a southwest direction (south of the Red Sea Rift) from the **Afar triple junction**, the fault continues as the **East African Rift Valley**, which split the older **Ethiopian highlands** into two halves.
- The East African Rift Valley transects through Ethiopia, Kenya, Uganda, Rwanda, Burundi, Zambia, Tanzania, Malawi and Mozambique. Before rifting, enormous continental **flood basalts erupted** on the surface, and the **Ethiopian**, **Somalian**, and **East African plateaus** were **uplifted**.
- The East African Rift Valley divides into the **Eastern Rift** and the **Western Rift**.

Eastern Rift (Gregory Rift)	• Stretches from the Red Sea to as far south as **Mount Kilimanjaro**. • One of the most important features is the **Afar Triple Junction**, found where the **Horn of Africa** straddles the Red Sea and the **Gulf of Aden** in the **Arabian Sea**. • At the Afar Triple Junction, the **Arabian**, **Nubian**, and **Somali plates** are separating. **Two arms** of the Afar Triple Junction continue to widen in the process of seafloor spreading — the arm extending into the Red Sea and the arm extending into the Gulf of Aden. • As these rifts continue, the narrow valley created by the Gregory Rift may sink low enough that the Arabian Sea will flood it, **separating the Horn of Africa (sitting on the Somali plate) from Africa and making it a continental island**.
Western Rift (Albertine Rift)	• It includes many of the **African Great Lakes** (some of the deepest lakes in the world). It is one of the most biodiverse regions in Africa, featuring a narrow corridor of highland forests, snow-capped mountains, savannas, and chains of lakes and wetlands.

Breaking up of Africa

- The East African Rift (EAR) is an **active continental rift zone** in East Africa. Extension rates are low to the south, where the rift is young. **Volcanism and seismicity are also limited**.
- Towards the **Afar region**, the entire rift valley floor is covered with volcanic rocks. This suggests that, in this area, **the lithosphere has thinned almost to the point of complete break-up**. Here, the African Plate is splitting into two tectonic plates, the **Somali Plate** and the **Nubian Plate (African Plate)**, at a rate of 6-7 mm annually.



Volcanism and seismicity along the East African Rift Valley

- The East African Rift Zone includes many active and dormant volcanoes. **Mount Kilimanjaro** is a **dormant stratovolcano** in **Tanzania**; **Mount Kenya** is an **extinct stratovolcano**. Although most of these mountains lie outside the Rift Valley, the EAR created them.

- The EAR is the **largest seismically active rift system** on Earth today. Most earthquakes occur near the **Afar Depression**, with the largest occurring along the faults.

2.3. African Great Lakes

- The African Great Lakes consist of **seven lakes** (**Lake Victoria**, **Tanganyika**, **Malawi**, **Turkana**, **Albert**, **Kivu**, and **Edward** in order of size) that span countries in East, South, and Central Africa.
- The African Great Lakes region includes **ten countries**: Burundi, the Democratic Republic of the Congo, Kenya, Malawi, Rwanda, Tanzania, Mozambique, Zambia, Uganda and South Sudan.

Lake	Drains into

Lake Victoria	**White Nile River**
Lake Albert	**White Nile River**
Lake Edward	**White Nile River**
Lake Tanganyika	**Congo River**
Lake Kivu	**Congo River**
Lake Malawi	**Zambezi via the Shire River**
Lake Turkana	**Endorheic lake**

2.3.1. Lakes in the Albertine Rift

Lake Victoria

- Lake Victoria is the **world's second-largest freshwater lake by surface area** (**Lake Superior is the largest**). It is also the **world's largest tropical lake**.
- The lake's area is divided among **Tanzania**, **Uganda and Kenya**. The only outflow from Lake Victoria is the **White Nile River**.

[UPSC 2000] Which one of the following lakes forms an international boundary between Tanzania and Uganda?

a) Chad
b) Malawi
c) Victoria
d) Zambezi

Answer: c) Victoria

Lake Tanganyika

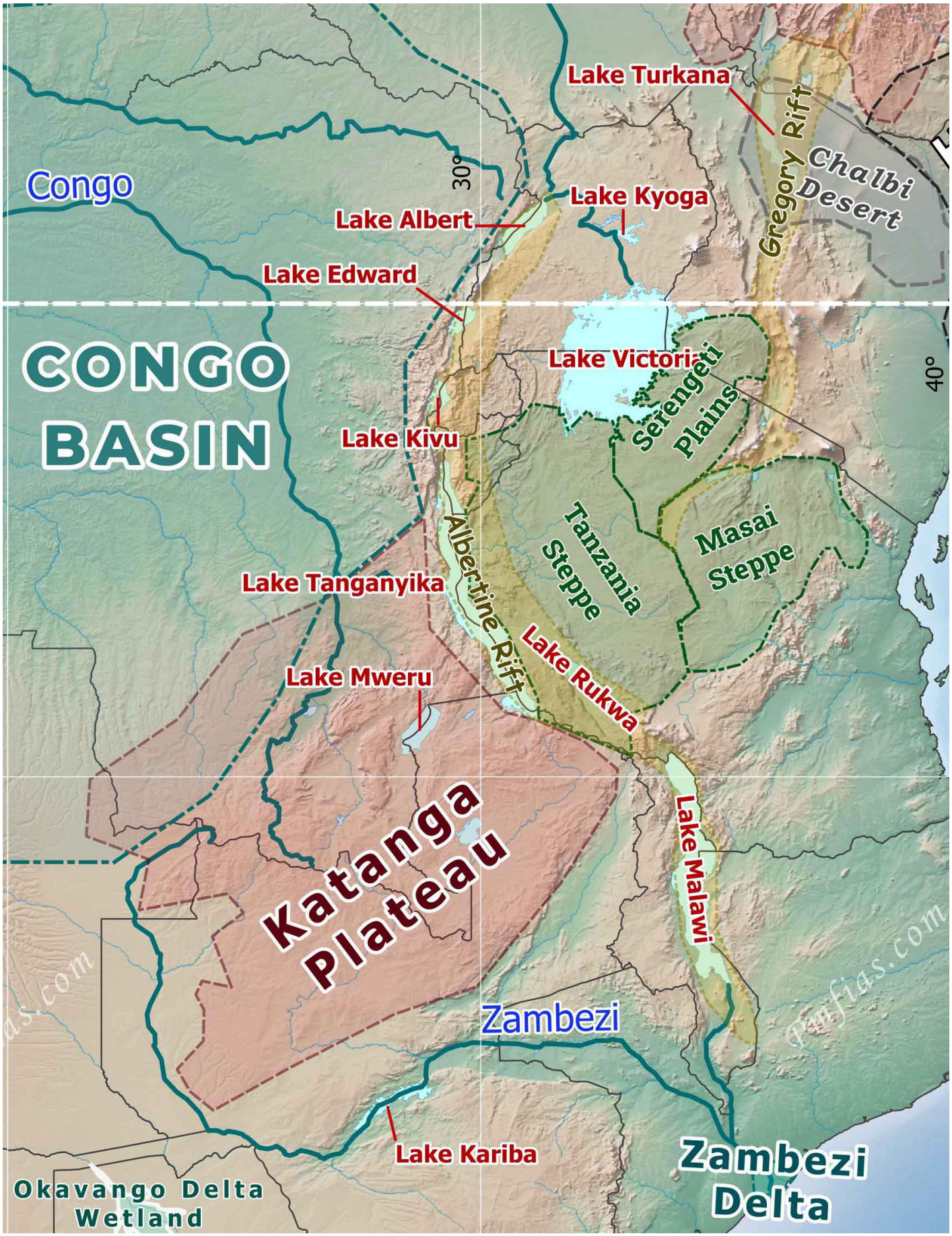
- Lake Tanganyika is the **second-largest freshwater lake by volume** (**Lake Baikal in Russia is the largest**).
- It is the **largest among the Albertine Rift Lakes**.
- It is also the **world's longest freshwater lake** and the **second deepest lake** (**Lake Baikal is the deepest**).
- The lake is shared between Tanzania, the Democratic Republic of the Congo (DRC), Burundi, and Zambia.

Lake Malawi (Lake Nyasa)

- Lake Malawi is the **southernmost lake** in the East African Rift system, between **Malawi**, **Mozambique and Tanzania**. It is the **second deepest lake in Africa**, after Lake Tanganyika.

Other Lakes in the Albertine Rift

- **Lake Albert** is the northernmost in the Albertine Rift and is shared by **Uganda** and the **DRC**.
- **Lake Edward** is the smallest of the African Great Lakes. **Uganda** and the **DRC** share it.
- **Lake Kivu** lies on the **border** between the **DRC** and **Rwanda**. It is the only lake among the African Great Lakes with **high amounts of methane and CO_2**.


Lake Turkana
Gregory Rift
Chalbi Desert
Congo
30°
Lake Kyoga
Lake Albert
Lake Edward
CONGO BASIN
Lake Victoria
Serengeti Plains
40°
Lake Kivu
Tanzania Steppe
Masai Steppe
Albertine Rift
Lake Tanganyika
Lake Rukwa
Lake Mweru
Lake Malawi
Katanga Plateau
Zambezi
Lake Kariba
Zambezi Delta
Okavango Delta Wetland

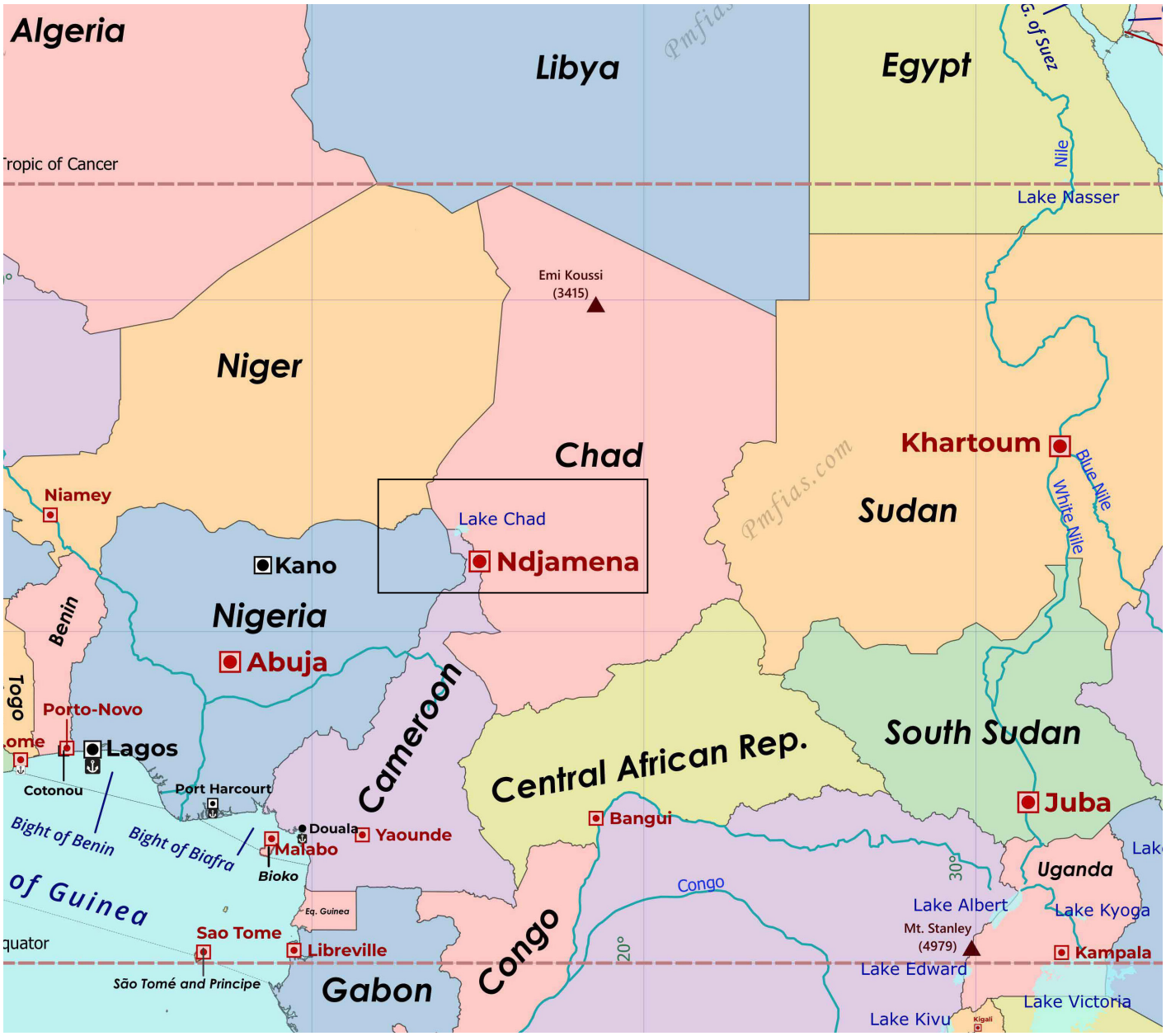
2.3.2. Other Major Lakes in Africa

Lake Turkana in the Kenyan Rift

- Lake Turkana is a lake in the **Kenyan Rift Valley** in northern Kenya that is shared by Ethiopia.
- It is the **world's largest permanent desert lake** and one of the largest **alkaline lakes**.
- It is an **endorheic lake** (no outflow to other external bodies of water).

Lake Chad

- **Lake Chad** is located in the conjunction of Chad, Cameroon, Nigeria, and Niger. It is a **shallow endorheic freshwater lake**.
- Lake Chad is one of the most severely endangered lakes in the world. (**Central Asia's Aral Sea** and **Israel's Lake Tiberias — also known as the Sea of Galilee** — are other notable endangered lakes).



[UPSC 2022] Which one of the following lakes of West Africa has become dry and turned into a desert?

a) Lake Victoria
b) Lake Faguibine
c) Lake Oguta
d) Lake Volta

Explanation

- Lake Faguibine is a former lake located in **Mali (Sahel Region)**, **West Africa**.
- The lake began drying up in the 1970s due to **drought conditions and increasing desertification** in the Sahel region. By the mid-1990s, it had completely dried up, leaving behind only desert sand.
- The factors for this situation are **low rainfall**, **high evaporation rates**, and **increased water usage** for irrigation and human activities.

Answer: b) Lake Faguibine

2.4. Major Mountain Ranges of Africa

Range	Location	Highest Peak	Notable Features
Atlas Mountains	Northwestern Africa (Algeria, Morocco, Tunisia)	**Mount Toubkal** (4,167 m)	• It serves as the **geologic backbone** of three countries in the **Maghreb region**: **Algeria**, **Morocco**, and **Tunisia**. • It separates the Atlantic Ocean and the Mediterranean Sea from the Sahara Desert. • **Subranges:** Anti-Atlas, High Atlas, Middle Atlas, Tell Atlas, Aures Mountains and Saharan Atlas.
Drakensberg	Southeastern coast of South Africa	Thabana Ntlenyana (3,482 m)	• Principal watershed for the **Orange River**. • **Tugela Falls** (**second-highest waterfall in the world**; **Angel Falls** in Venezuela is the **highest**)
Rwenzori	Eastern Equatorial Africa (DR Congo, Uganda)	Margherita Peak on Mount Stanley (~5,100 m)	• It is a collection of six **Glaciated massifs:** Mount Stanley, Mount Baker, Mount Gessi, etc. • Often identified as the "**Mountains of the Moon**". • Known for **copper and cobalt minerals**.

Ethiopian Highlands	Central and northern Ethiopia, northern Eritrea	**Ras Dashen** (4,533 m)	• Divided into the **Abyssinian Massif** and **Harar Massif** by the Ethiopian Rift Valley.
Virunga Mountains	Uganda, Rwanda, Democratic Republic of Congo (DRC)	Mount Karisimbi (~4,500 m)	• Comprises eight major volcanoes • It is a **branch of the Albertine Rift**. • **Active volcanoes:** Mount Nyiragongo and Mount Nyamuragira • **Habitat of critically endangered mountain gorillas**.

2.4.1. The Eastern Rift Mountains

- The Eastern Rift, also known as the **Gregory Rift**, is part of a larger rift system stretching from the **Red Sea** to **Mozambique**. A series of volcanoes and mountains are along the **eastern side of the East African Rift Valley**.

Notable Peaks

Mount Kilimanjaro

- It is the **highest peak in Africa at 5,895 meters** and is a **dormant stratovolcano** in **Tanzania** with glaciers on its slopes. It is the **world's most significant free-standing mountain rise** (not part of a mountain range). It is nicknamed the "**Roof of Africa**".

Mount Kenya

- Located in **Kenya**, it is the **second-highest mountain peak (an extinct volcano)** in Africa at 5,199 meters. It is recognised as a UNESCO World Heritage Site.

Mount Elgon

- It is an **extinct shield volcano** located on the **Kenya-Uganda border**. It is the **world's largest mountain caldera** (a significant depression formed when a volcano erupts and collapses). It has one of the largest volcanic bases in the world.

2.4.2. Table Mountain

- Table Mountain is a distinctive flat-topped mountain overlooking Cape Town, South Africa. Its unique shape comes from eroded horizontal sandstone layers. It is known for its "**Tablecloth**" — a characteristic cloud formation created by southeastern winds.

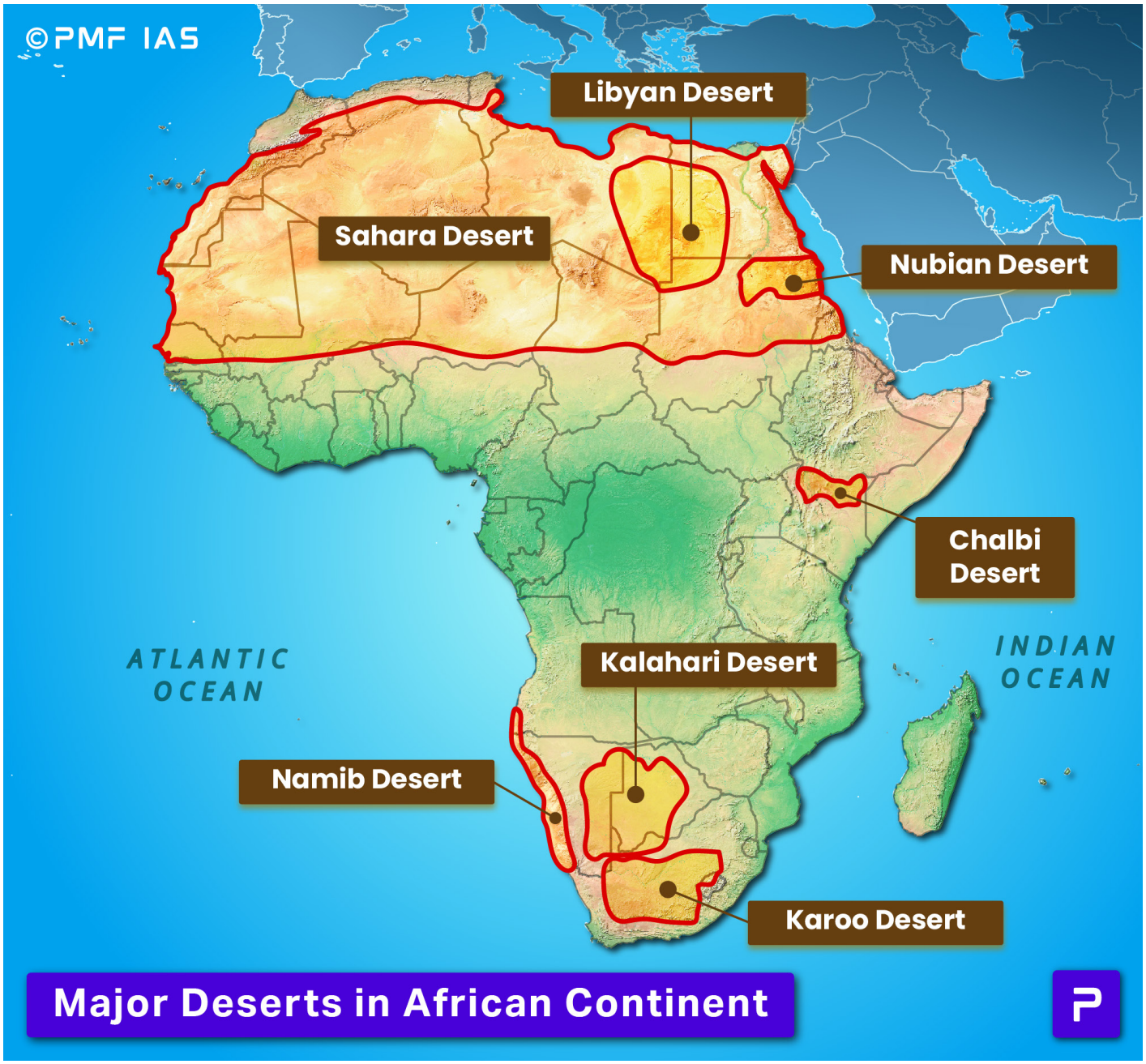
[UPSC 2013] Which one of the following pairs is correctly matched?

Geographical Feature	***Region***
(a) Abyssinian Plateau	Arabia
(b) Atlas Mountains	North-Western Africa

(c) Guiana Highlands	South-Western Africa
(d) Okavango Basin	Patagonia

Answer: b) Atlas Mountains – North-Western Africa

2.5. Major Deserts of Africa



2.5.1. Sahara Desert

- It is the **world's largest hot desert** and the **third-largest desert overall**, smaller only than the deserts of **Antarctica** and the **northern Arctic**.
- The desert comprises much of North Africa, excluding the fertile Mediterranean coast region, the **Atlas Mountains of the Maghreb (Northwest Africa)**, and the **Nile Valley** in Egypt and Sudan.
- It is bounded by the Atlas Mountains and the Mediterranean Sea in the north, the Red Sea in the east, the Atlantic Ocean in the west, and the **Sahel (semi-arid transitional region)** in the south.
- The **Ahaggar Mountains** and the **Tibesti Mountains** are the major mountains in the desert.
- **Touches 11 countries:** Algeria, Chad, Egypt, Libya, Mali, Mauritania, Morocco, Niger, Sudan, Tunisia, and Western Sahara.

- **Hottest landscape:** In 1922, **Al Azizia (Libya)** in the Sahara recorded the highest temperature, 57.7 °C.
- **Drainage:** Several rivers discharge into **Lake Chad** in the southern Sahara; the **Niger** rises in Fouta Djallon region of Guinea and flows through southwestern Sahara before turning southward to the sea.
- **Tribes:** **Bedouins** and **Tuaregs** are the prominent nomadic tribes.

Tafilalt, Morocco

- Considered one of the **biggest self-contained oases in the world**, **Tafilalt** is located in the **Sahara Desert region of Morocco**. (The largest self-contained oasis in the world is the **Al-Ahsa**, situated in south-eastern Saudi Arabia and fed by numerous natural springs and artesian wells).

> ⇨ A **self-contained oasis** is a **fertile area in an arid or semi-arid region** with a **self-sustaining water supply** and ecosystem that is independent of external sources.

2.5.2. Kalahari Desert

- The Kalahari Desert is a large **semi-arid sandy savanna** in Southern Africa covering much of **Botswana**, parts of **Namibia**, and regions of **South Africa**.
- The **Makgadikgadi Pan (Botswana) salt pans** and **Etosha Pan (Namibia)** are located here. The only permanent river, the **Okavango**, flows into the **Okavango Delta marshes** (rich in wildlife).

2.5.3. Namib Desert

- The Namib stretches for more than 2,000 km along the Atlantic coasts of **Angola**, **Namibia**, **and South Africa**. It is a **cold coastal desert**.
- Gravel plains and mountain outcrops characterise the interior landscape, while the coastal areas feature vast sand seas. The **sand dunes** in this desert rank **among the tallest in the world**.

2.5.4. Karoo Desert

- It is more of a **semi-desert** with a barren landscape in South Africa. It has one of the most important **fossil deposit** sites.

2.5.5. Nubian Desert

- The Nubian Desert is bordered by **Egypt** to the north, the Red Sea to the east, the **Nile River** to the south, and the Libyan Desert to the west.
- Characterised by **rocky terrain**, this desert differs from typical desert landscapes, featuring a **predominant sandstone plateau with scattered sand dunes**.
- Despite its arid conditions, the Nubian Desert supports limited habitation by **Nubian nomads**.

2.5.6. Libyan Desert

- It is situated in the **northeastern Sahara** and stretches from eastern **Libya** through southwestern **Egypt** into the extreme northwest of Sudan.

- The desert's landscape is characterised by **bare rocky plateaus**, **stony plains**, **and sandy expanses**, creating harsh, arid, and inhospitable conditions.
- **Mount Al-ʿUwaynat (1,934 meters)** marks the **highest point of the desert**, located at the meeting point of Libya, Egypt, and Sudan.

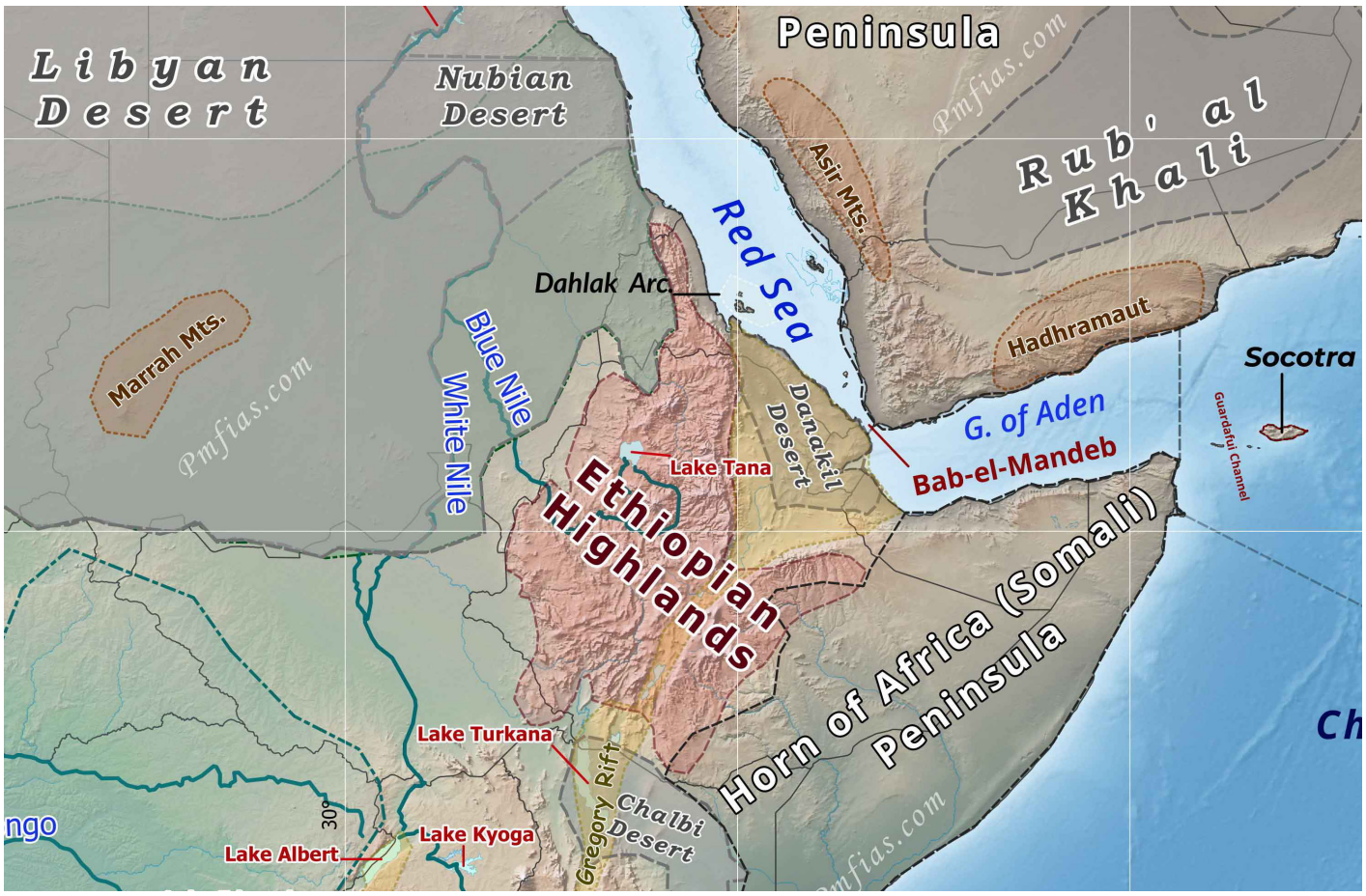
2.6. Major Plateaus of Africa

2.6.1. The South African Plateaus

- The South African Plateaus cover most of the interior of **South Africa**, **Lesotho**, and **Swaziland**. They are **part of the African Highlands**, a vast plateau that extends across central and southern Africa. They are characterised by extensive, flat landscapes punctuated by **occasional hills and mountains**.
- The plateaus are divided into the **Interior Plateau**, **the Drakensberg Plateau**, and **the Great Karoo**.

2.6.2. The East African Plateaus

- The East African Plateaus are a **series of elevated regions** that stretch from Tanzania to Ethiopia, encompassing parts of Kenya, Uganda, and Somalia. They are **part of the Great African Plateau**, which covers much of central and eastern Africa.



- The average elevation ranges from 900 to 1,800 meters above sea level and is characterised by **rolling hills**, **escarpments**, and **volcanic mountains**.

- The plateaus are divided into several distinct regions, including the **Masai Steppe**, **the Serengeti Plateau**, and **the Ethiopian Plateau**.
- **Serengeti National Park** and **the Ngorongoro Conservation Area** are within these plateaus.

2.6.3. Sanetti Plateau

- The Sanetti Plateau is located in southeastern Ethiopia's Bale Range. The **Bale Mountains National Park** is part of this plateau and occupies much of it.
- The Sanetti Plateau is **formed by successive outpourings of lava** tens of millions of years ago. The plateau is an **extensive high-altitude feature in Africa**, spanning thousands of square kilometres with **several volcanic cones** rising above 4,000 meters.

2.7. Major Plains of Africa

2.7.1. Bushvelds

- The Central **Bushveld** Ecoregion spans the **southeast corner of Botswana** and **northern South Africa**. Its southern boundary is demarcated by the **Highveld Grassland** (cool and high-elevated).
- It has the **rugged Waterberg Mountains**, rising from an extensive undulating plateau to 1,200 and 1,500 meters. The climate is **tropical** and **seasonal**, with hot, wet summers and cool, dry winters. Vegetation is dominated by **winter-deciduous mopane tree stands**, transitioning into woodland savanna towards the north.

2.7.2. Serengeti Plains

- The Serengeti, also known as the Serengeti Plains (**undulating plain**), is Africa's most renowned savanna region, spanning 30,000 km^2 from **Kenya's Maasai-Mara game reserve to Tanzania's Serengeti National Park**. It boasts **one of the highest concentrations of large mammal species** on the continent, including lions, hyenas, zebras, giraffes, and elephants.
- Annually, the Serengeti witnesses the **spectacular migration of over one million wildebeest**, which traverse the plains in a **circular route** following the seasonal rains.

Serengeti-Mara Ecosystem

- The Serengeti-Mara transboundary ecosystem, spanning **Southwestern Kenya and Northern Tanzania**, is renowned for its rich wildlife and breathtaking landscapes.
- It encompasses the **Serengeti National Park** and **Maasai Mara National Reserve**, forming one of the largest protected ecosystems on Earth.

Olduvai Gorge

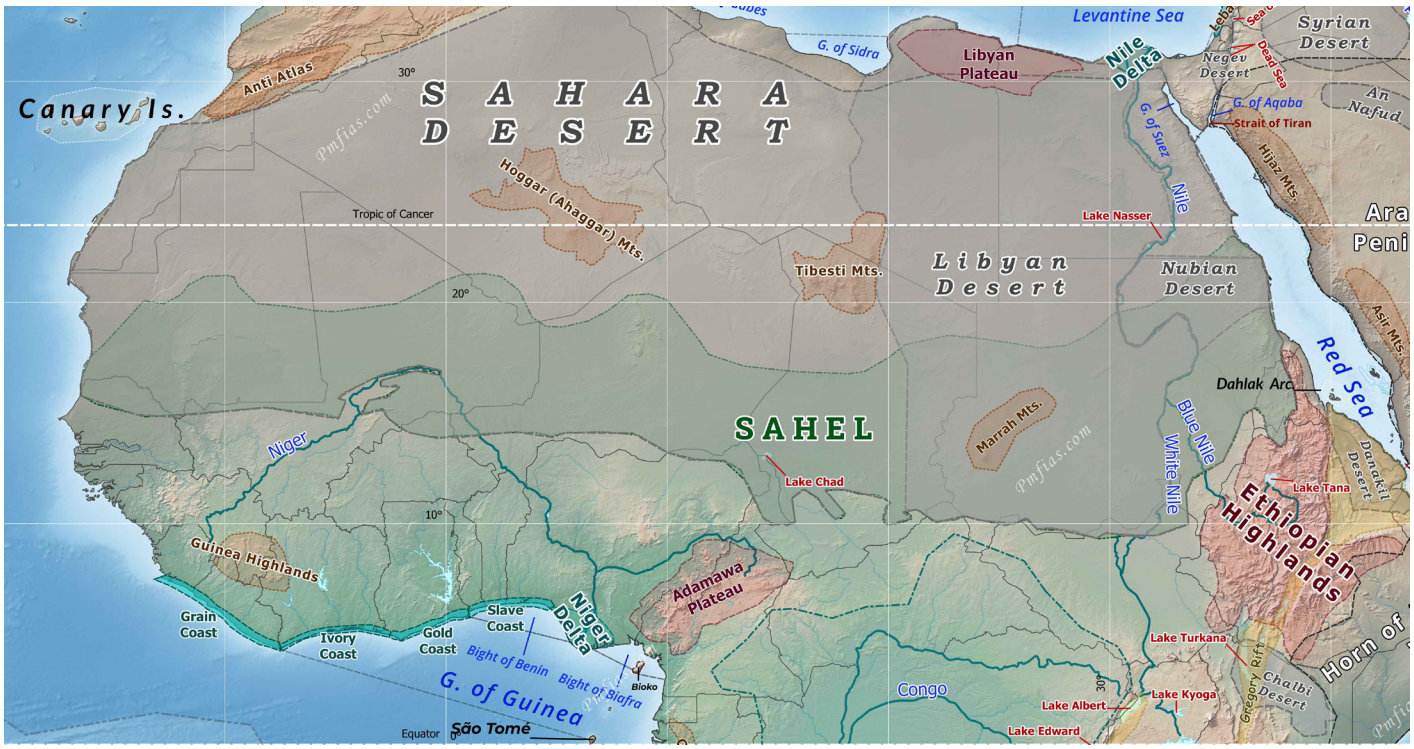
- The Olduvai Gorge, situated in the eastern Serengeti Plain within the Ngorongoro Conservation Area in northern Tanzania, is a significant **paleoanthropological site**. It provides a continuous record of human evolution over the past 2 million years.

- The gorge's **sedimentary deposits**, dating from approximately 2.1 million to 15,000 years ago, have yielded fossils of over 60 hominins, along with the longest archaeological record of stone-tool industries.

2.8. Other Geographical Features

2.8.1. Sahel

- The **Sahel** is a **transitional semi-arid region** that separates the Sahara Desert in the north and the tropical savanna to the south. It is characterised by **barren**, **sandy**, **and rocky land** containing grasslands, thorny shrubs, acacia, and baobab trees.
- The Sahel stretches **east-west** from the **Atlantic Ocean to the Red Sea**. It includes northern Senegal, southern Mauritania, central Mali, northern Burkina Faso, south of Algeria, Niger, north of Nigeria, Cameroon and Central African Republic, central Chad, central and southern Sudan, the extreme north of South Sudan, Eritrea, and the extreme north of Ethiopia.



2.8.2. Sinai Peninsula

- It is a **triangular**, **arid peninsula** in **northeastern Egypt** that serves as a **land bridge** between Asia and Africa. The **Suez Canal separates the peninsula from mainland Egypt**.
- It is surrounded by the Mediterranean Sea in the north, the Red Sea in the south, the **Gulf of Aqaba** in the southeast and Israel in the east.
- **Israel occupied the Sinai Peninsula** in the aftermath of the 1967 Six-Day War. It was returned to Egypt in 1982 after implementing the 1979 Egypt-Israel Peace Treaty.

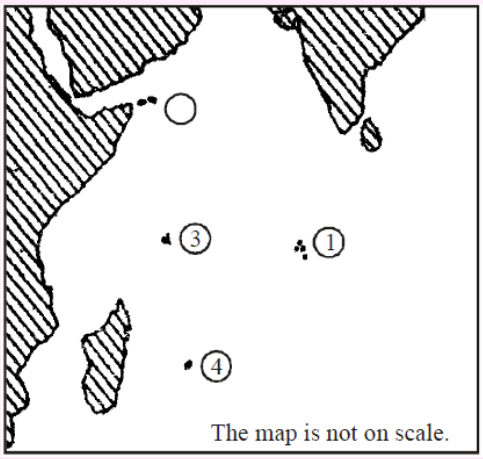
2.8.3. Suez Canal

- It is an **artificial sea-level waterway** in Egypt. It connects the **Mediterranean Sea to the Red Sea** through the **Isthmus of Suez**.
- The canal **separates the African continent from Asia** and provides the **shortest maritime route** between Europe and the lands around the Indian and western Pacific oceans.
- The United Kingdom and France owned the canal until July 1956. **Egypt's nationalisation of the canal** led to the **Suez Crisis of 1956**. Egypt's Suez Canal Authority (SCA) now owns and maintains the canal.

2.8.4. Red Sea

- The Red Sea, stretching about 1,200 miles (1,930 km) from **Suez**, **Egypt**, to the **Bab el-Mandeb Strait**, connects with the **Gulf of Aden** and the **Arabian Sea**. It separates **Egypt**, **Sudan**, **Djibouti** and **Eritrea** in the west from **Saudi Arabia** and **Yemen** in the east (Trick: **Y SEEDS**)
- The Red Sea is part of a rift valley caused by the separation of the Arabian and African tectonic plates. In the north, it splits into the **Gulf of Suez** (shallow) and the **Gulf of Aqaba** (deep).

[UPSC 2002] In the map given below, four islands of the Indian Ocean region, i.e., (A) Seychelles (B) Chagos (C) Mauritius and (D) Socotra are marked as 1, 2, 3 and 4. Match them and select the correct answer from the codes given below:



Codes:

a) A-1; B -3; C-4; D-2
b) A-3; B-1; C-2; D-4
c) A-1; B-3; C -2; D-4
d) A-3; B- 1; C-4; D-2

Answer: d) A-3; B- 1; C-4; D-2

[UPSC 2022] The term "Levant" often heard in the news roughly corresponds to which of the following regions?

a) Region along the eastern Mediterranean shores
b) Region along North African shores stretching from Egypt to Morocco
c) Region along the Persian Gulf and the Horn of Africa
d) The entire coastal area of the Mediterranean Sea

Explanation

- The term "Levant" refers to the geographic region along the **eastern Mediterranean shores**.
- It primarily encompasses the countries of **Syria**, **Lebanon**, **Israel**, **Jordan**, **Cyprus**, and **parts of southern Turkey**. The Levant region got its name from the French lever, which means "**to rise**."

Answer: a) The Region along the eastern Mediterranean shores

2.8.5. Caprivi Strip

- The Caprivi Strip is a narrow extension of **Namibia**, stretching ~450 km from the country's northeast corner to the **Zambezi River**. It lies on the swampy northern margin of the Kalahari. The region, a **flat plain**, borders Angola to the north, Botswana to the south, and Zambia to the northeast. The strip creates the **only international quadripoint** in the world.

⇨ A **quadripoint** is where four different countries or administrative territories intersect. Quadripoints are extremely rare due to the geological and political challenges of creating such a precise border configuration. E.g. the **Kazungula Quadripoint** of **Zambia**, **Zimbabwe**, **Botswana**, and **Namibia**.

⇨ A **tripoint** is a geographical location where the borders of three different countries or territories meet at a single point. There are **175** international tripoints. **Africa** has the most, with 61, Asia has 51, and Europe has 48.

2.8.6. Danakil Depression

- The **Danakil Depression**, also known as the **Afar Depression**, formed due to the **continental drift of the African and Asian tectonic plates**. It is located at the triple junction of three tectonic plates and spans Djibouti, Eritrea, and Ethiopia's Afar region.
- It is **one of the hottest places on Earth** due to vibrant hot springs, bubbling sulfur pools, vast salt flats, and the iconic **Erta Ale volcano**, with its **active lava lake**.
- In 1974, the remains of Lucy, a 3.2-million-year-old ancestor of modern humans, were discovered here.
- The acidic springs of the **Dallol Crater** have drawn scientists searching for **extremophile microbes**, offering insights into the origins of life on Earth and potential early life on Mars.

[UPSC 2024] One of the following regions has the world's largest tropical peatland, which holds about three years worth of global carbon emissions from fossil fuels; and the possible destruction of which can exert a detrimental effect on the global climate. Which one of the following denotes that region?

a) Amazon Basin
b) Congo Basin
c) Kikori Basin
d) Rio de la Plata Basin

Answer: b) Congo Basin

[UPSC 2022] Consider the following statements:

1. Bidibidi is a large refugee settlement in northwestern Kenya.
2. Some people who fled from the South Sudan civil war live in Bidibidi.
3. Some people who fled from civil war in Somalia live in the Dadaab refugee complex in Kenya.

Which of the statements given above is/are correct?

a) 1 and 2
b) 2 only
c) 2 and 3
d) 3 only

Explanation

Statement 1 is incorrect and statement 2 is correct

- **Bidibidi** is located in **northwestern Uganda**, not Kenya. It is one of the largest refugee settlements in the world, specifically designed to accommodate the influx of **South Sudanese refugees**.

- Established in September 2016, Bidibidi was created to address the rapid increase in refugee numbers from **South Sudan's civil war**, particularly those fleeing from the Greater Equatoria region.
- It has grown significantly, reaching a population of over 280,000 people.

Statement 3 is correct

- The **Dadaab refugee** complex in **Kenya** is home to many people who fled the **civil war in Somalia**.
- Established in 1991 as a temporary shelter for 90,000 refugees from Somalia's civil war, Dadaab has grown into one of the largest refugee camp in the world, now housing over 300,000 residents.
- The camp continues to accommodate refugees fleeing ongoing conflicts, famine, and instability in Somalia.
- Despite being in operation for over two decades, the camp is still expanding to address the needs of new arrivals from Somalia and other conflict-affected regions.

Answer: c) 2 and 3

[UPSC 2022] Consider the following pairs:

Country	***Important reason for being in the news recently***
1) Chad	Setting up of permanent military base by China
2) Guinea	Suspension of Constitution and Government by Military
3) Lebanon	Severe and prolonged economic depression
4) Tunisia	Suspension of Parliament by President

How many pairs given above are correctly matched?

a) Only one pair
b) Only two pairs
c) Only three pairs
d) All four pairs

Explanation

- In early December, 2021, media reports alleged that China was trying to build its military base in **Equatorial Guinea**. Although **no such base or construction** seems to have come to fruition so far.
- **Djibouti** hosts **China's first international military base**, strategically enhancing China's influence and military reach in Africa. (located in the Horn of Africa adjacent to the Gulf of Aden).
- On **September 5, 2021**, the armed forces in **Guinea** staged a coup, capturing the country's President. The military leaders detained the president, announcing the dissolution of the government and the suspension of the constitution.
- **Lebanon** has been experiencing a **prolonged and severe economic crisis**, characterized by a significant economic downturn, currency devaluation, and widespread poverty. The crisis has been exacerbated by the Beirut port blast and ongoing political instability.

- In July 2021, the **President of Tunisia** declared the **suspension of the country's Parliament**, dismissing Prime Minister Hicham Mechichi and the Cabinet.

Answer: c) Only three pairs

[UPSC 2018] Very recently, in which of the following countries having lakhs of people either suffered from severe famine/acute malnutrition or died due to starvation caused by war/ethnic conflicts?

a) Angola and Zambia
b) Morocco and Tunisia
c) Venezuela and Colombia
d) Yemen and South Sudan

Explanation

- In 2017, some of the worst food crises occurred in north-eastern Nigeria, Somalia, **Yemen**, and **South Sudan**. Nearly 32 million people across these regions faced severe food insecurity and were in urgent need of assistance. These crises were driven by a combination of conflict, drought, and economic challenges, exacerbating hunger and malnutrition.

Answer: d) Yemen and South Sudan

2.9. Recently In The News

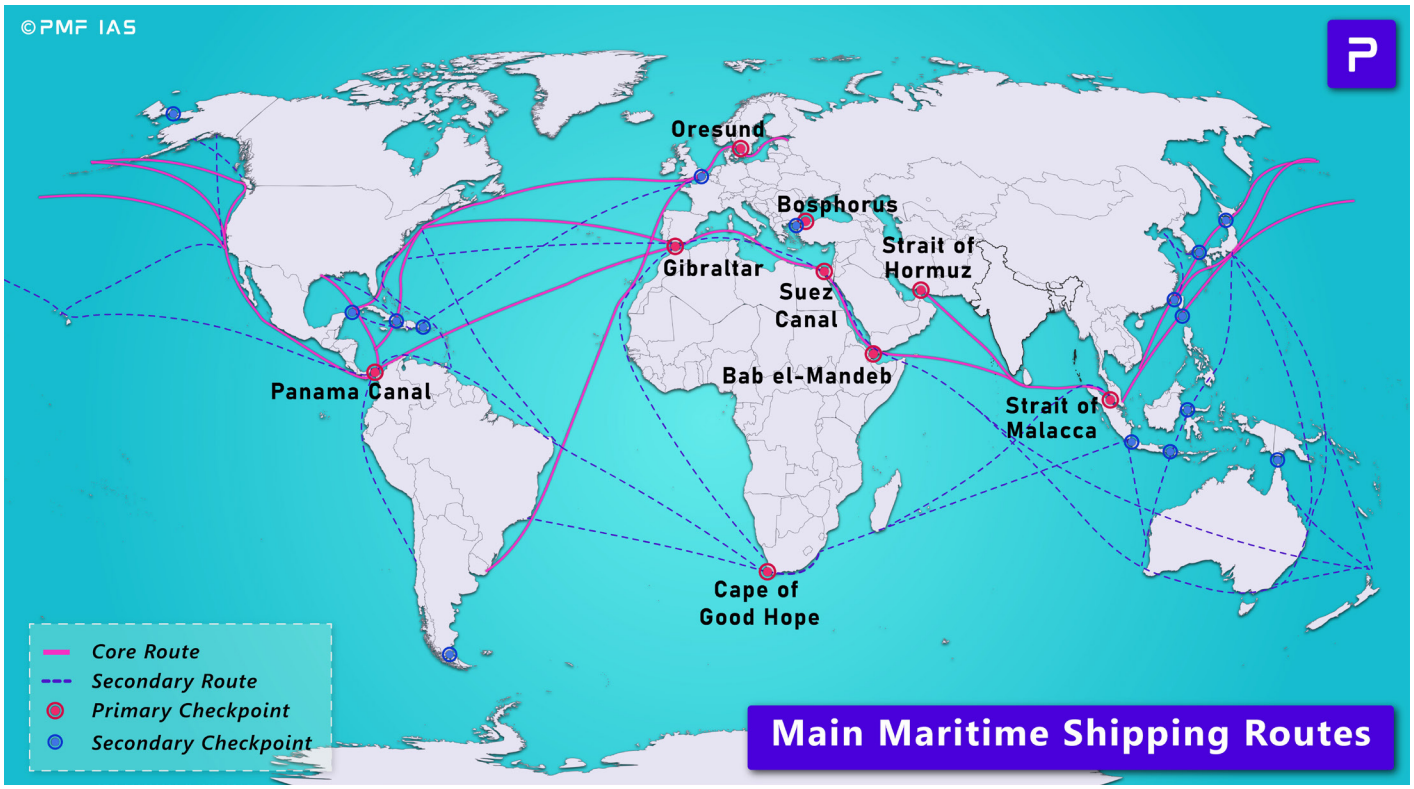
2.9.1. Barberton Greenstone Belt

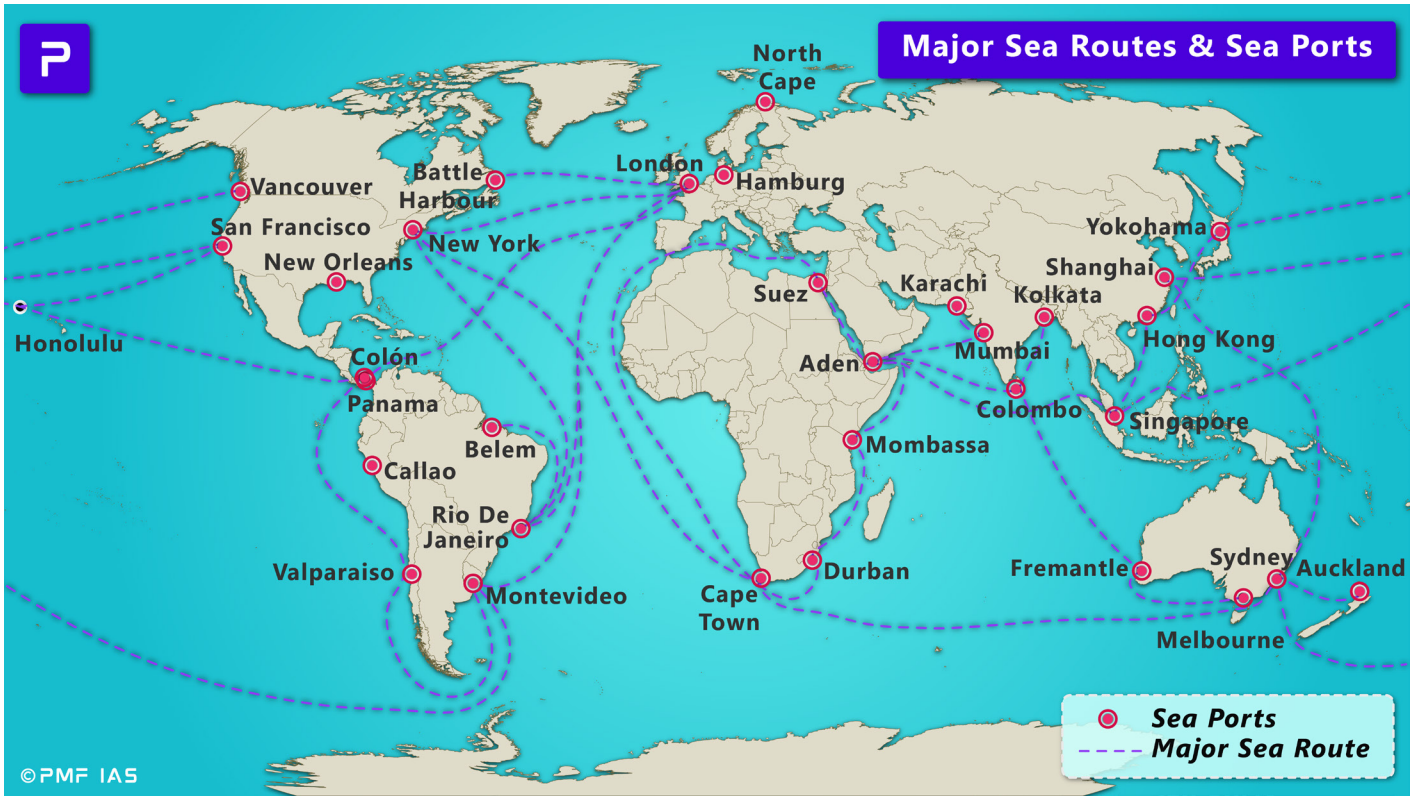
- It is a geological formation in **South Africa**. It is known for its **gold mineralisation** and **komatiites** (an unusual type of ultramafic volcanic rock), named after the **Komati River** that flows through the belt. It contains the **best-preserved**, **oldest exposed volcanic and sedimentary rocks** on Earth (greater than 3.6 billion years old), unaffected by subduction, metamorphism and erosion.
- Recently, researchers have assessed the effects of an ancient meteorite impact in the Barberton Greenstone Belt that acted as a **giant fertiliser bomb** for life on Earth. The meteorite delivered a **large amount of phosphorus**, a nutrient for microbes crucial for the molecules central to storing and conveying **genetic** information.

2.9.2. Cape Route

- The **European-Asian sea route** (Cape Route) is a shipping route from the European coast of the Atlantic Ocean to Asia's coast of the Indian Ocean. It passes via the **Cape of Good Hope** and **Cape Agulhas** at the southern edge of Africa.
- The Cape route was the direct route discovered by **Vasco da Gama** to reach India from Europe. The opening of the **Suez Canal** route led to a decline in shipping through the longer Cape Route. However, ships larger than the **Suezmax** size (maximum ship size for the Suez Canal) must use the Cape route.

- Cape Route has **become less critical**, although it still is an alternative secondary route if the Suez Canal is somehow disrupted, for e.g. in case of recent **Houthi attacks**.





Cape of Good Hope and Cape Aghulhas

- **Cape of Good Hope** is a **rocky headland** on the Atlantic coast of the Cape Peninsula in **South Africa**.
- **Cape Agulhas** is the **southern tip of Africa**, not the Cape of Good Hope.

- Cape Agulhas is the **dividing line** between the **Atlantic** and **Indian Oceans**. It is also the meeting point of the **Agulhas warm ocean current** and the **Benguela cold ocean current**.

2.9.3. Forever Chemicals in Lake Victoria

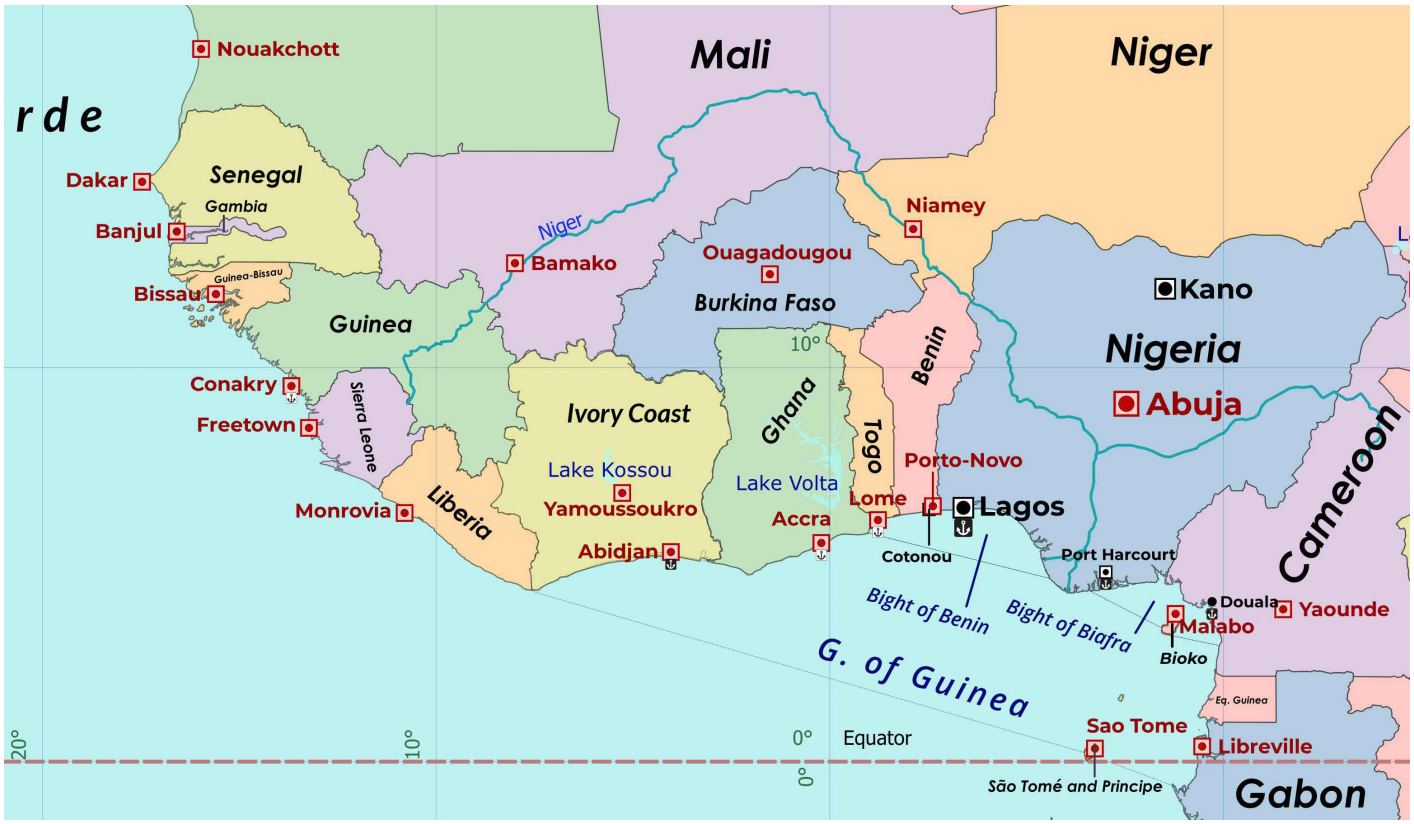
- **Forever chemicals** are polluting Lake Victoria and the surrounding water bodies.
- **Lake Victoria is Africa's largest lake by area**, the **world's largest tropical lake**, and the second-largest freshwater lake. Kenya, Uganda and Tanzania border it. It is the source of the **White Nile**.
- Lake Victoria touches the Equator on its northern side.

PFAS, or Forever Chemicals

- **Forever Chemicals** have been found in soil, drinking water, our bodies and marine animals. Their proper scientific name is **perfluoroalkyl and polyfluoroalkyl substances (PFAS)**. But they're more commonly called "forever chemicals" because they almost never break down once they're in an environment.

2.9.4. Ghana

- Ghana was recently in the news for its **plans to establish its first nuclear energy plant**.
- **Bordering countries:** Burkina Faso, Togo, Côte d'Ivoire.
- **Water bodies:** Atlantic Ocean to the south, the Gulf of Guinea.



2.9.5. Great Bitter Lake

- It is a saltwater lake in Egypt between the Mediterranean and Red Sea, connected to both seas by the **Suez Canal**.

Importance

- **Global Trade:** The **Suez Canal**, with the Great Bitter Lake as a key component, shortens the maritime route between Europe and Asia by up to 7,000 kilometres, boosting international trade.
- **Traffic Management:** The lake helps manage the traffic flow in the narrow canal, allowing ships to pass safely and efficiently, especially in the event of congestion.

2.9.6. India's Stand on Chagos Islands

- India reaffirmed its support for Mauritius' sovereignty over the **Chagos Islands**, signalling a strong stance against the neo-imperialist ambitions of major global powers.

Chagos Islands

- The Chagos archipelago is a group of **seven atolls in the Indian Ocean**, comprising at least 60 islands about 500 km south of the **Maldives** and more than 2000 km northeast of Mauritius.
- The Chagos Islands are the southernmost archipelago of the **Chagos-Laccadive Ridge**, a long submarine mountain range in the Indian Ocean.
- The **Great Chagos Bank** is the largest atoll in the world.
- The Chagos Islands, including **Diego Garcia**, house a critical US military base in the Indian Ocean.
- **Key Islands:** Solomon Islands, Diego Garcia, Nelson's Island, etc.

2.9.7. M23 Rebels in Congo

- M23 rebels have intensified their control in the eastern **Democratic Republic of Congo (DRC)**, capturing **Goma** and advancing toward **Bukavu**, with regional implications.
- M23 stands for the **March 23 Movement** to protect **Tutsi** interests and demand full integration of Congolese Tutsis into the army and administration, per the 2009 Peace Accord.

Democratic Republic of Congo (DRC)

- **Geography and Size:** Second-largest country in Africa, bordered by nine countries.
- **Historical Conflict:** DRC has endured several wars, with the First and Second Congo Wars claiming millions of lives, often fuelled by ethnic tensions and competition for resources (it is home to vast natural resources, including **cobalt**, copper, and **coltan**).
- **Economic Challenges:** Despite its mineral wealth, the DRC remains mired in poverty, corruption, and ongoing conflict, with regions like **North and South Kivu** often the centre of insurgencies.
- **Coltan Mining:** Coltan, short for **columbite-tantalite**, is a dull metallic ore containing **niobium** and **tantalum**, which are used to create tantalum capacitors, essential components in **electronic devices** like cell phones and laptops. M23 has controlled key coltan mining regions, like Rubaya in North Kivu.

Strategic Importance of Goma

- Goma is situated near the borders with **Rwanda** and **Uganda**.
- The city hosts nearly 500,000 displaced people, further complicating the humanitarian crisis.

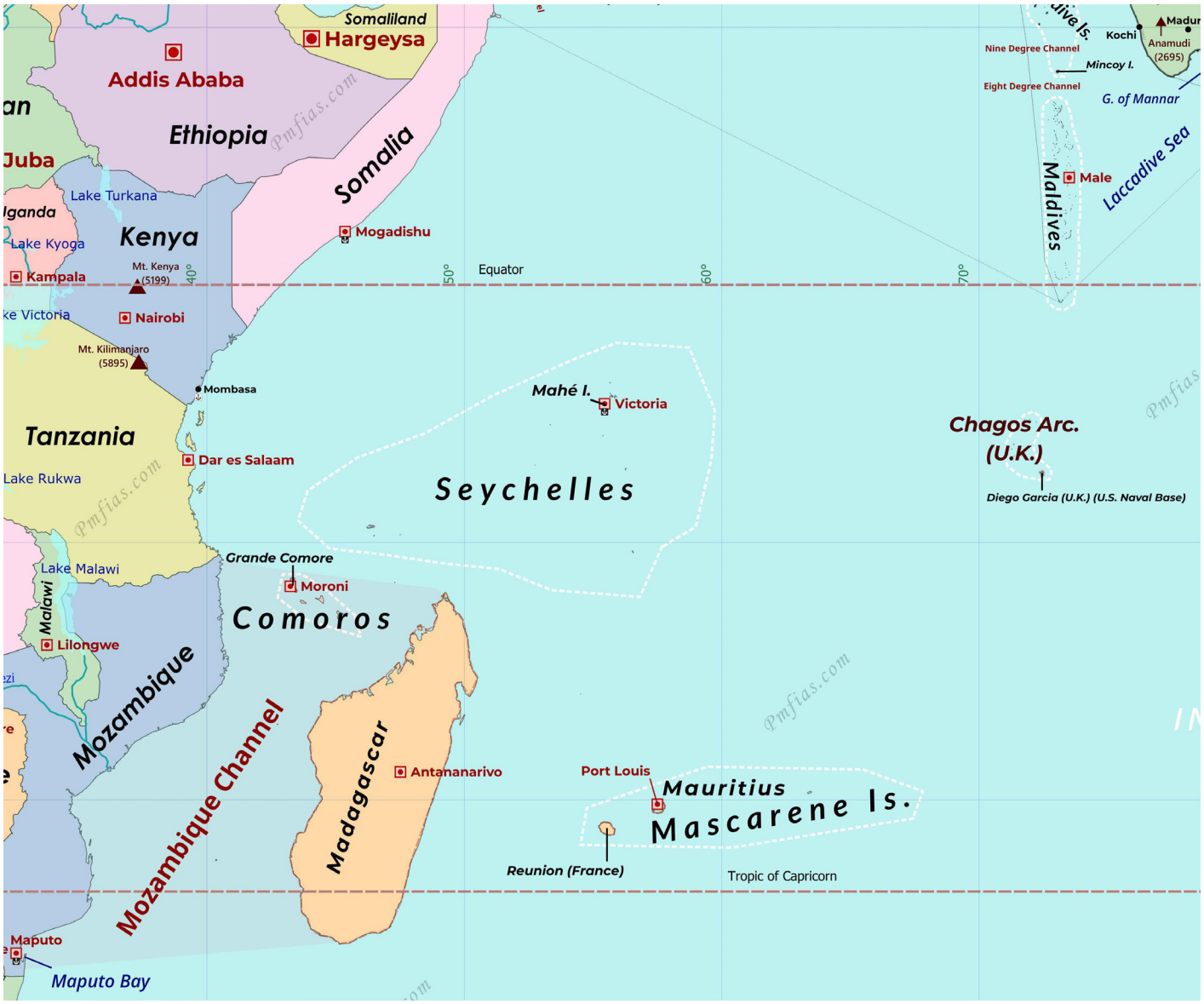
- Goma's proximity to Rwanda and Uganda has made it a focal point for economic trade and conflict.

2.9.8. Kenya

- Kenya was recently in the news because of the violent protests against the proposed tax hikes.
- **Chief port:** **Mombasa**.
- **Lake Turkana (Lake Rudolf)** is the **world's largest permanent desert lake**. Many anthropologists consider this area the cradle of humankind due to the abundance of hominid fossils.

2.9.9. Port Louis

- Recently, the **Indian Navy's INS Imphal** visited Port Louis, the capital city of **Mauritius**, as part of a goodwill mission.
- **Port Louis** is a major port and financial hub. It has a rich colonial history, diverse heritage, and a blend of African, Indian, French, and Chinese influences.
- Its strategic location enhances India's **SAGAR** (Security and Growth for All in the Region) vision and maritime cooperation.



2.9.10. Sahara Desert witnesses first flood in 50 years

- Recently, a rare deluge of rainfall has left lagoons of water amid the palm trees and sand dunes of the Sahara Desert. NASA satellites showed water rushing into **Lake Iriqui**, a famous lake bed that had been dry for 50 years.

2.9.11. Zimbabwe

- Zimbabwe is investigating a suspected case of lion poaching in **Hwange National Park**, home to half of Zimbabwe's 100,000 elephants.
- Zimbabwe is a **landlocked country**. It shares a border on the south with **South Africa** and is bounded on the southwest and west by **Botswana**, on the north by **Zambia**, and on the east by **Mozambique**.
- The **Zambezi River** forms a natural riverine boundary with **Zambia**. **Lake Kariba (one of the world's largest manmade lakes)**, constructed on the **Zambezi River**, forms the **world's largest reservoir by volume**.

- Zimbabwe is home to the **world's largest waterfall — Victoria Falls (on the Zambezi River)**, known locally as 'Mosi-oa-Tunya' (the smoke that thunders).

---------- End of Chapter ----------

3. North America

Area	• 24.3 million km^2 (**3rd largest continent**)
Longitudinal Extent	• 173° W (Attu Island, Aleutian Islands, Alaska, USA) to 11.5° W (Nordostrundingen, Greenland). • The Attu Island is even further west than the Hawaiian Islands. • North America lies **entirely within the Western Hemisphere**. • It has **five time zones**.

Latitudinal Extent	• 5.5° N (Cocos Island, Costa Rica) to 85° N (Kaffeklubben Island, Greenland) • It is **entirely located in the Northern Hemisphere**.
Sovereign Countries	• 23 • **In decreasing order of population**: **United States**, **Mexico**, **Canada**, Guatemala, Haiti.
Major Cities	• **In decreasing order of population**: **Mexico City**, New York City, Los Angeles, Chicago, and Toronto.
Largest Lake	• **Lake Superior** (the **world's largest freshwater lake by surface area** and the third largest freshwater lake by volume — after **Lake Baikal** & **Lake Tanganyika**)
Highest Mountain	• Mount Denali **(Mount McKinley) (6190 m)**
Longest Rivers	1. **Missouri (4087 km)** 2. **Mississippi (3765 km)** 3. **Yukon (3186 km)**
Facts	• **Lowest Point: Death Valley**, **California** (-282 feet below sea level) • **Canada** is the largest country by area. • **Greenland** is geographically a part of the North American continent. • In North America, there are **no landlocked countries**. • **Mammoth Cave** in **Mammoth Cave National Park**, **Kentucky**, is the world's longest cave system. • **Mauna Kea**, located on **Hawaii** in the USA, is the world's second-highest mountain island. (**first – New Guinea**).

[UPSC 2009] Cape Canaveral, the site from which space shuttles are launched is located on the coast of:

a) Florida
b) Virginia
c) North Carolina
d) South Carolina

Explanation

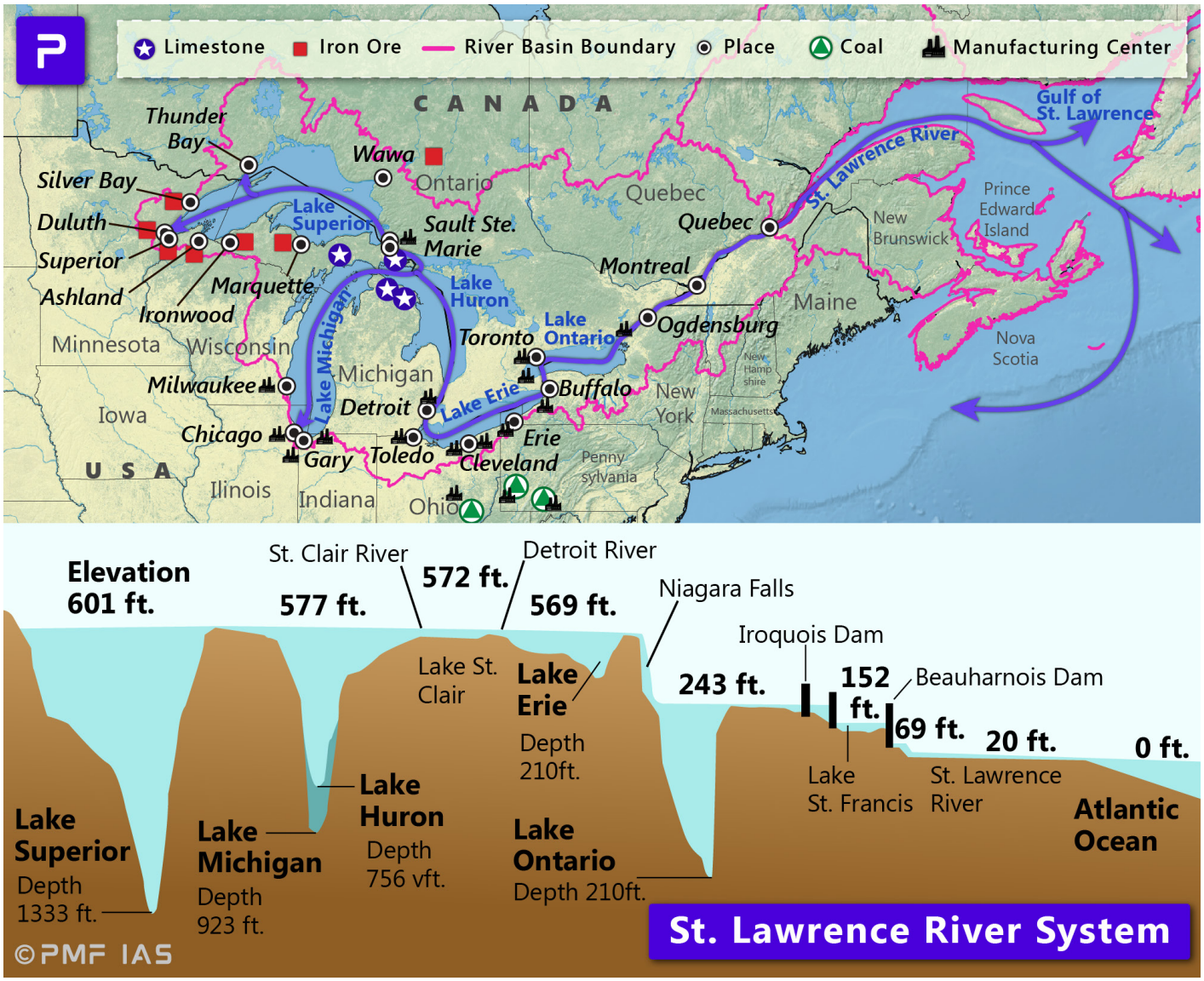
Answer: a) Florida

3.1. Major Lakes of North America

3.1.1. Great Lakes

- The Great Lakes of North America are a series of **interconnected freshwater lakes** formed in a **fault zone of highly deformed rocks**. They connect to the Atlantic Ocean through the **Saint Lawrence Seaway**. They form part of the political boundary between the United States and Canada.

- Within the Great Lakes system, water flows from Lake Superior and Lake Michigan to Lake Huron, through **Lake St. Clair into Lake Erie**, over **Niagara Falls** and Lake Ontario before flowing through the St. Lawrence River into the ocean.



Facts

- The Great Lakes are the **largest group of freshwater lakes** on Earth by total area.
- They are the **second-largest by total volume**, containing **21% of the world's surface fresh water**.
- **Lake Superior** is the **world's largest freshwater lake** and the **second-largest (after the Caspian Sea)** lake by surface area.
- **Lake Superior** is the **deepest** of the Great Lakes.
- **Lake Erie** is the **shallowest** of the five Great Lakes.
- Lake Superior flows into Lake Huron through the **St. Mary's River**.
- **Lake Michigan** is **located entirely within the USA**.
- **In the order of west to east: Superior, Michigan, Huron, Erie, and Ontario (SMHEO)**
- **In the order of largest to smallest: Superior, Huron, Michigan, Erie, and Ontario (SHMEO)**

Niagara Falls

- It is located on the **Niagara River**, which drains **Lake Erie** into **Lake Ontario** on the border between **Ontario (Canada)** and **New York State (USA)**. There are two waterfalls in Niagara, the **American Falls** and the **Canadian Horseshoe Falls**, separated by **Goat Island**.
- The formation of Niagara Falls is linked to glacier melting and the creation of the Great Lakes.

3.1.2. Other Lakes

Great Salt Lake

- The **Great Salt Lake** is an **endorheic (no outlet) lake** in the **U.S. state of Utah**. It is the **largest inland body of saltwater in the Western Hemisphere**, and its salinity is comparable to the **Dead Sea**. It is fed by the Bear, Weber, and **Jordan** (Michigan; Jordan River in West Asia drains into the Dead Sea) **rivers**.

Great Bear Lake

- Great Bear Lake is situated in the northern Fort Smith and southeastern Inuvik regions of **Canada's North-west Territories**. It is the **largest lake in Canada**, located entirely within its border.
- Big Spruce, Whitefish, Haldane, and Dease rivers flow into Great Bear Lake.

Great Slave Lake

- Great Slave Lake is located near the Alberta border in the southern Northwest Territories, **Canada**. Its shoreline features **large bays** with rocky slopes and numerous islands. The lake is fed by the **Slave River**, which drains westward via the **Mackenzie River** into the **Arctic** Ocean.

Lake Winnipeg

- Lake Winnipeg is located in south-central Manitoba, **Canada**, at the southwestern edge of the **Canadian Shield**. It is fed by numerous rivers, such as the Saskatchewan, Red, and **Winnipeg**. The lake is drained to the northeast by the **Nelson River** into **Hudson Bay**.

Lake Nicaragua

- Lake Nicaragua is an **oval-shaped freshwater lake** in southwestern **Nicaragua** and the **largest lake in Central America**. It is believed that Lake Nicaragua and Lake Managua initially formed part of an ocean bay that became an inland basin due to volcanic eruptions.
- More than 40 rivers flow into Lake Nicaragua, with the **Tipitapa River** being the largest.

Lake Athabasca

- Lake Athabasca is located in **Canada**. It receives water from the southwest via the **Peace** and **Athabasca rivers**, whose deltas have separated it from Lakes Claire and Mamawi. The lake drains northwest through the **Slave River**, eventually flowing into the **Arctic Ocean** via **Great Slave Lake** and the **Mackenzie River**.

3.2. Major Rivers of North America

3.2.1. River Missouri

- The Missouri River (~4,090 km) is the **longest river in North America**. It is a **tributary of the Mississippi River**. It flows **eastward and south-eastward** across several states, including Montana, North Dakota, South Dakota, Nebraska, Iowa, Kansas, and Missouri.

Source	• Confluence of the Jefferson, Madison, and Gallatin rivers in the **Rocky Mountains** area of southwestern Montana.
Mouth	• **Mississippi River** near St. Louis.
Drainage Basin Countries	• USA
Main Tributaries	• Kansas, Niobrara, and Yellowstone rivers.
Important Cities	• **Great Falls** (Montana), Bismarck (North Dakota), **Kansas City** (Missouri), **St. Louis** (Missouri).
Important Dams/Reservoirs	• **Garrison Dam**

3.2.2. River Mississippi

- The Mississippi River (~3,766 km) is the **second-longest river** in North America. When combined with the **Missouri-Jefferson** (Red Rock) system downstream of their confluence, the Mississippi River measures 5,971 km, ranking it as the fourth longest river in the world.

Beaufort Sea
Baffin Bay
Greenland (Denmark)
Yukon
Mackenzie
Great Bear Lake
Fraser
Great Slave Lake
Columbia
Hudson Bay
Labrador Sea
Gulf of Alaska
Lake Athabasca
Canada
Lake Winnipeg
Bering Sea
St. Lawrence
Mississippi
Missouri
Lake Ontario
Lake Superior
Lake Huron
Lake Erie
Lake Michigan
Great Salt Lake
Utah Lake
Colorado
Ohio
U.S.A
Arkansas
Rio Grande
Mexico
Pacific Ocean
Atlantic Ocean
G. of Mexico
Caribbean Sea
North America Rivers and Lakes
©PMF IAS

Strait of Belle Isle
Winnipeg
G. of Saint Lawrence
Lake Superior
Duluth
Quebec
Ottawa
St. Lawrence
Bay of Fundy
Minneapolis
Montreal
Cape Breton Island
Lake Huron
Toronto
Halifax
Lake Michigan
Lake Ontario
Boston
G. of Maine
Nova Scotia
Buffalo
Detroit
Lake Erie
Missouri
New York
Massachusetts Bay
Chicago
Cleveland
Pittsburgh
Long Island
Baltimore
Philadelphia
Newfoundland
Kansas City
St. Louis
Ohio
Washington, D.C.
Delaware Bay
Chesapeake Bay
Oklahoma City
Arkansas
Mississippi
Dallas
Hamilton
Austin
Houston
New Orleans
Straits of Florida
Sargasso Sea
Grand Bahama
Andros
G. of Mexico
Miami
Nassau

Source	• **Lake Itasca**, northern Minnesota.
Mouth	• Mississippi River Delta, **Gulf of Mexico**
Drainage Basin Countries	• USA
Main Tributaries	• **Missouri**, Ohio, **Arkansas**, Red, Rock, etc.
Important Cities	• **New Orleans**, **Minneapolis**, and St. Louis
Major Dams	• Upper St. Anthony Falls Lock and Keokuk Dam.

3.2.3. Yukon River

- The Yukon River flows through the central Yukon territory in **northwestern Canada** and the central region of **Alaska in the United States**. It is a **slow-moving braided stream** known for its **shallowness**, except during the spring when it swells with meltwater.

Source	• **Atlin Lake** and **Tagish Lake** are near the border between British Columbia and Yukon territory.
Mouth	• Norton Sound on the **Bering Sea**, **Alaska (USA)**.
Drainage Basin Countries	• Canada and USA
Main Tributaries	• Teslin River, White River, and Stewart River.
Important Cities	• Dawson, **Yukon**, etc.
Major Dams	• Whitehorse Dam

3.2.4. Rio Grande

- It is a **transboundary river** between the **USA** and **Mexico** and is North America's fifth longest river (3,051 km). In Mexico, it is called **Rio Bravo del Norte**. After passing through New Mexico, the Rio Grande forms the border between the **U.S. state of Texas** and the **northern Mexican states**.

Source	• **San Juan Mountains of Colorado** in the southern Rockies, USA.
Mouth	• Gulf of Mexico, **Atlantic Ocean**.
Drainage Basin Countries	• USA and Mexico
Main Tributaries	• **San Juan** river.
Important Cities	• **Albuquerque**, El Paso, Texas, and **Chihuahua**.
Major Dams/Reservoirs	• Lake Toronto, **Falcon Reservoir**, and Amistad Dam.

3.2.5. St. Lawrence

- The **St. Lawrence River** is a unique hydrographic system embedded in an **ancient geologic depression**, including the **Canadian Shield**, the **Appalachians**, and an intervening sedimentary rock platform. It is an **international**, **intra-Quebec**, and **multiprovincial system**, linking North America's industrial and agricultural heartlands to the Atlantic Ocean and beyond.

Source	• Begins at the **outflow of Lake Ontario**.
Mouth	• **Atlantic Ocean**, Eastern Canada.

Drainage Basin Countries	• USA and Canada
Main Tributaries	• **Ottawa**.
Important Cities	• **Montreal**, **Quebec** City, and Cornwall.

St. Lawrence Seaway

- The **Saint Lawrence Seaway** (completed in 1959) is a **system of locks and canals that permits** vessels to travel between the **Atlantic Ocean** and the **Great Lakes**.
- St. Lawrence Seaway is a **joint navigational project** by **Canada** and the **United States**. It allows deep-draft ocean vessels to reach North America's interior, creating a waterway that stretches 3,766 km from Duluth, Minnesota, at **Lake Superior's westernmost point**, to the Atlantic.
- The entire Great Lakes-St. Lawrence system encompasses 15,289 km of navigable waterways.

3.2.6. Colorado River

- Colorado has **carved deep canyons into the arid landscape**, such as the **Grand Canyon in Arizona**, Glen Canyon, Marble Canyon, and Cataract Canyon further upstream in Utah.

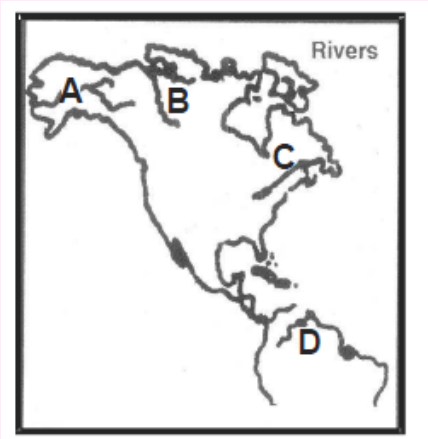
Source	• Continental Divide in **Rocky Mountain National Park**, Colorado, USA.
Mouth	• **Gulf of California (Pacific Ocean)**, Mexico.
Drainage Basin Countries	• USA and Mexico.
Main Tributaries	• Green River, **San Juan River**, Little Colorado River, Virgin River.
Important Cities	• Denver, **Las Vegas**, **Los Angeles**, **San Diego**, Phoenix, Tucson, etc.

Grand Canyon

- The Grand Canyon in northwestern Arizona is a massive gorge carved over millions of years by the **Colorado River**. The canyon lies within the **Colorado Plateau**. It is over 400 km long, up to 29 km wide and attains a depth of over a mile in some places. It runs through the heart of **Grand Canyon National Park**.

[UPSC 1998] Match the rivers labelled A, B, C and D on the given map with their names given in the list and select the correct answer using the codes given below the lists:

List – I



List – II

1. St. Lawrence
2. Orinoco
3. Mackenzie
4. Amazon
5. Yukon

Codes:

a) A-4; B-3; C-2; D-1

b) A-5; B-3; C-1; D-2

c) A-5; B-4; C-1; D-3

d) A-3; B-1; C-4; D-2

Answer: b) A-5; B-3; C-1; D-2

3.3. Major Deserts of North America

3.3.1. The North American Desert

- It stretches along the **western side** of the North American continent. It extends from southern Oregon and Idaho through the intermountain regions to northern Mexico. This **rain-starved region** roughly lies between the Rocky Mountains to the east and the Pacific Coast Ranges to the west.
- The North American Desert can be subdivided into **Cold Mid-Latitude Deserts** (**Great Basin Desert** and **Painted Desert**) and **Hot Mid-Latitude Deserts** (**Chihuahuan Desert**, **Mojave Desert**, and **Sonoran Desert**).

Great Basin Desert

- It is the **only cold desert in the USA**. It is characterised by hot, dry summers and snowy winters.
- It is located between the **Sierra Nevada** and the eastern edge of the Rocky Mountains, which is part of the larger **Great Basin region**. The **Great Salt Lake** and **Black Rock Desert** are part of this desert.
- Deep valleys, dry lakebeds, and **flat salt pans** alternate with parallel mountain ranges. It creates diverse subregions, such as **salt deserts**, saline basins, sagebrush slopes, and carbonate valleys.

Chihuahuan Desert

- It is the **largest desert in North America**. It covers parts of **northern Mexico** and the **southwestern United States**. The landscape is diverse, with valleys, mountains, plateaus and lowlands. Major geographic features include the **Rio Grande Valley**, the **Pecos Valley**, and sections of the **Mexican Plateau**.
- The desert is **one of the most biologically rich arid environments globally**.

Mojave Desert

- It is in the **Southwestern United States** (spanning parts of California, Nevada, Arizona, and Utah). Mountain ranges like the **Sierra Nevada** border it.
- The **Mojave Desert** contains North America's **lowest**, **driest and hottest place** called **Death Valley**, which is 86 m below sea level, where the temperature often surpasses 49 °C in summer.

Sonoran Desert

- It stretches from **northwestern Mexico** across the **southwestern USA**. It has broad valleys separated by long, narrow mountain ranges. Major ranges include the **Kofa Mountains**, Santa Catalina Mountains (which receive snow), Sierra San Pedro Martir, and the Laguna Mountains

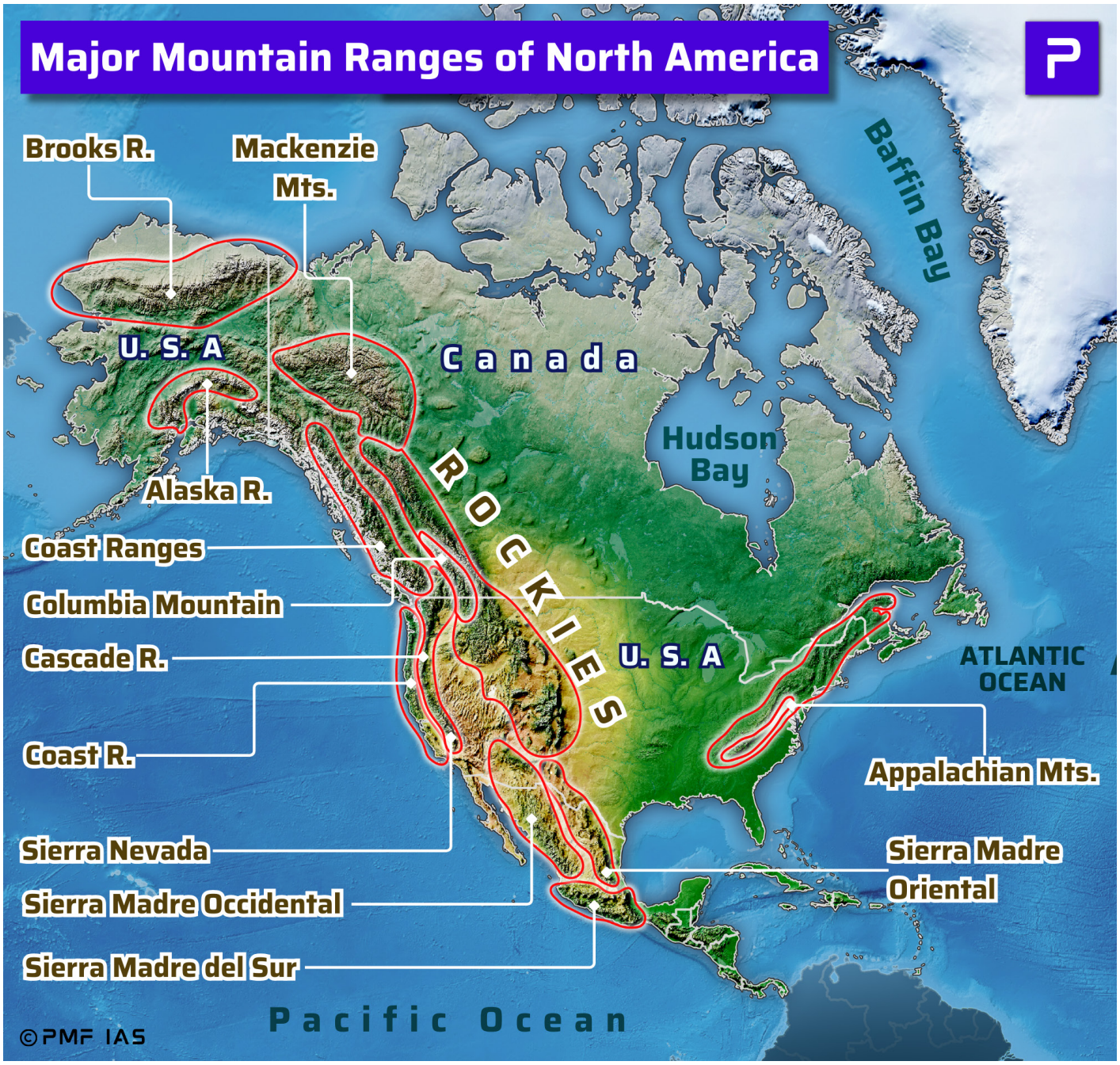
3.3.2. Osoyoos Desert

- It is **Canada's only desert** located in the southernmost part of the **Okanagan Valley** (a dry shrub-grassland area), **British Columbia**. Osoyoos experiences a **semi-arid climate** with hot, dry summers and mild winters. **Osoyoos Lake**, the warmest freshwater lake in Canada, never wholly freezes over during winter.

3.4. Mountain ranges in North America

3.4.1. Appalachian Mountains

- The Appalachian Mountains stretch ~3,200 km from **Newfoundland and Labrador in Canada to central Alabama in the United States**. It forms a **natural barrier** between the eastern Coastal Plain and the Interior Lowlands.
- The Appalachian Mountains are **among the oldest mountains on Earth**, formed by potent tectonic activity and sculpted by erosional activities over millions of years. **Mount Mitchell** (2,037 m) in North Carolina is the highest peak.



- An intricate network of rivers, streams, and waterfalls crisscross the Appalachian region. A distinctive feature is the **Great Appalachian Valley**, which includes the St. Lawrence River valley in Canada and **Tennessee valleys** in the USA.
- The Appalachian system can be divided into **three major physiographic regions**: northern, central, and southern Appalachia. **Allegheny Mountains** are a part of the central Appalachia.

3.4.2. North American Cordillera

- The North American Cordillera (chain or network of mountain ranges) is a **sequence of mountain ranges** that begins with the **Alaska Range** and the **Brooks Range** and extends through the **Mackenzie Mountains**, the **Coast Mountains**, the **Rocky Mountains**, the **Sierra Nevada**, and the **Sierra Madre**.

- It is an extensive mountain system that continues through the **mountain ranges of Central America** and ultimately becomes the **Andes Mountains in South America**.
- The western part of the North American Cordillera contains the highest ranges in this mountain system.

3.4.3. Rocky Mountains

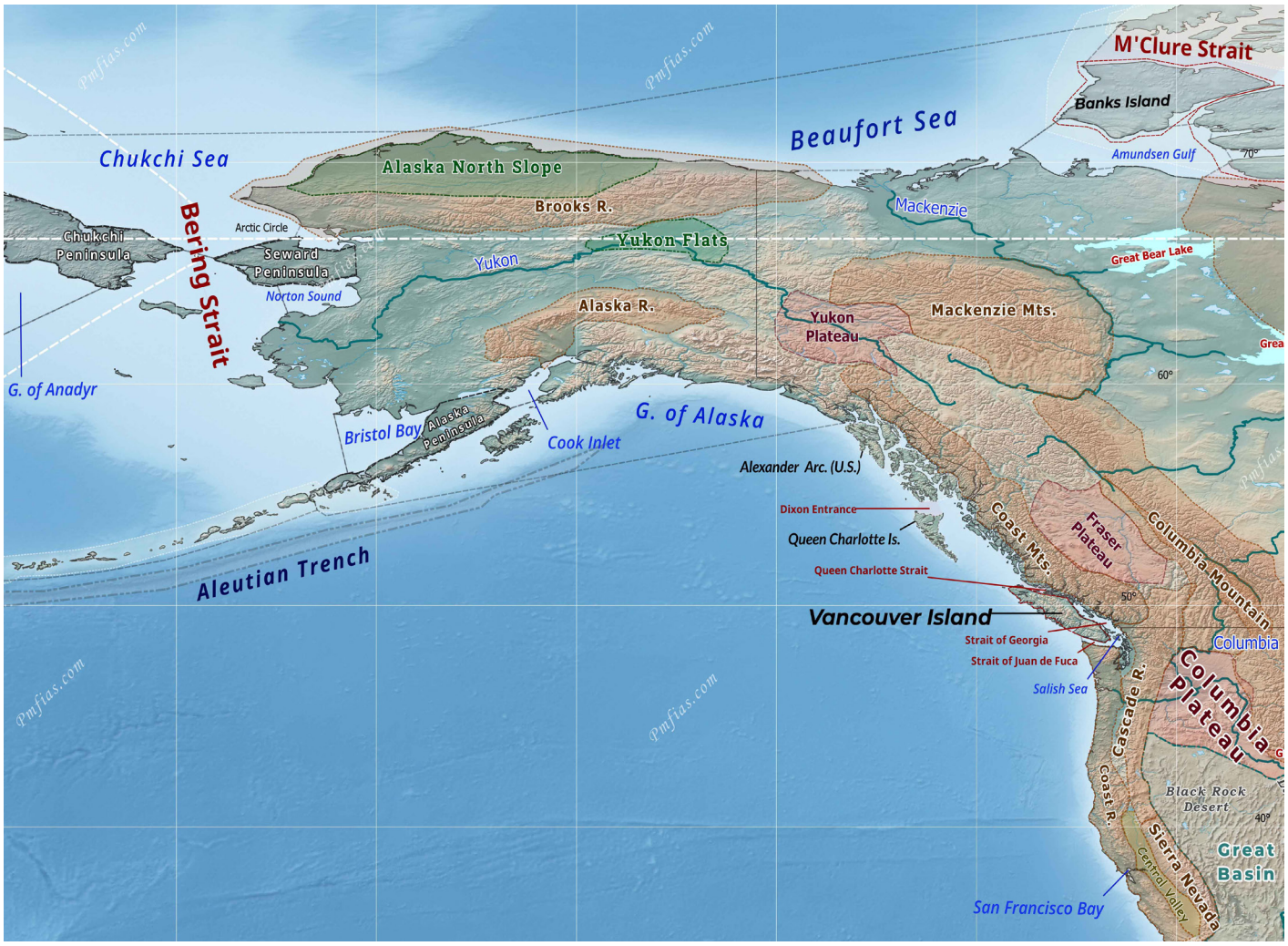
- The Rocky Mountains (~4,800 km), often called the **Rockies**, form the **cordilleran backbone** (the eastern-most part of the North American Cordillera). The range runs from northern **Alberta and British Columbia in Canada to New Mexico in the United States**.
- The Rockies were formed during the **Laramide Orogeny** (80 and 55 million years ago). Further tectonic activities, erosion, and the glaciers of the **Pleistocene** and **Holocene Epochs** shaped the mountainous landscape.
- The **Great Plains** borders the Rockies to the east and by the Interior Plateau, Coast Mountains, **Columbia Plateau**, and Basin and Range Province to the west.
- **Mount Elbert (~4,400 meters) in the Sawatch Range** is the highest peak in the Rocky Mountains.
- The Rocky Mountains have over 100 distinct ranges, generally categorised into four broad groupings:
  1. **Canadian Rockies:** It forms a **natural boundary** between Alberta and British Columbia. It includes the **Mackenzie** and **Selwyn mountains** in the Yukon and Northwest Territories.
  2. **Middle Rockies:** It is characterised by **high mountain peaks with glacial tops**.
  3. **Southern Rockies:** It has high basins like the Arkansas River and San Luis Valley. The **mountain ranges are higher** compared to the Canadian and Middle Rockies. For example, Mount Elbert (4,401 meters) in the **Sawatch Range** of Colorado is the highest point in the Rocky Mountains.
  4. **Colorado Plateau:** Situated in the **Four Corners** region of **Utah**, **Colorado**, **New Mexico**, and **Arizona**, this area is known for its high elevation, deep canyons and striking rock formations.
- The **Western Continental Divide** follows the crests of the Rocky Mountains in northwestern Canada and the continental United States. This divide acts as a **hydrological boundary**, separating waters that flow into the Pacific Ocean from those that drain into the Arctic or Atlantic Oceans.
- In Glacier National Park's **Lewis Range**, **Triple Divide Peak** stands out as a unique point where water can flow into **three bodies**: the Atlantic, Pacific, and Hudson Bay.

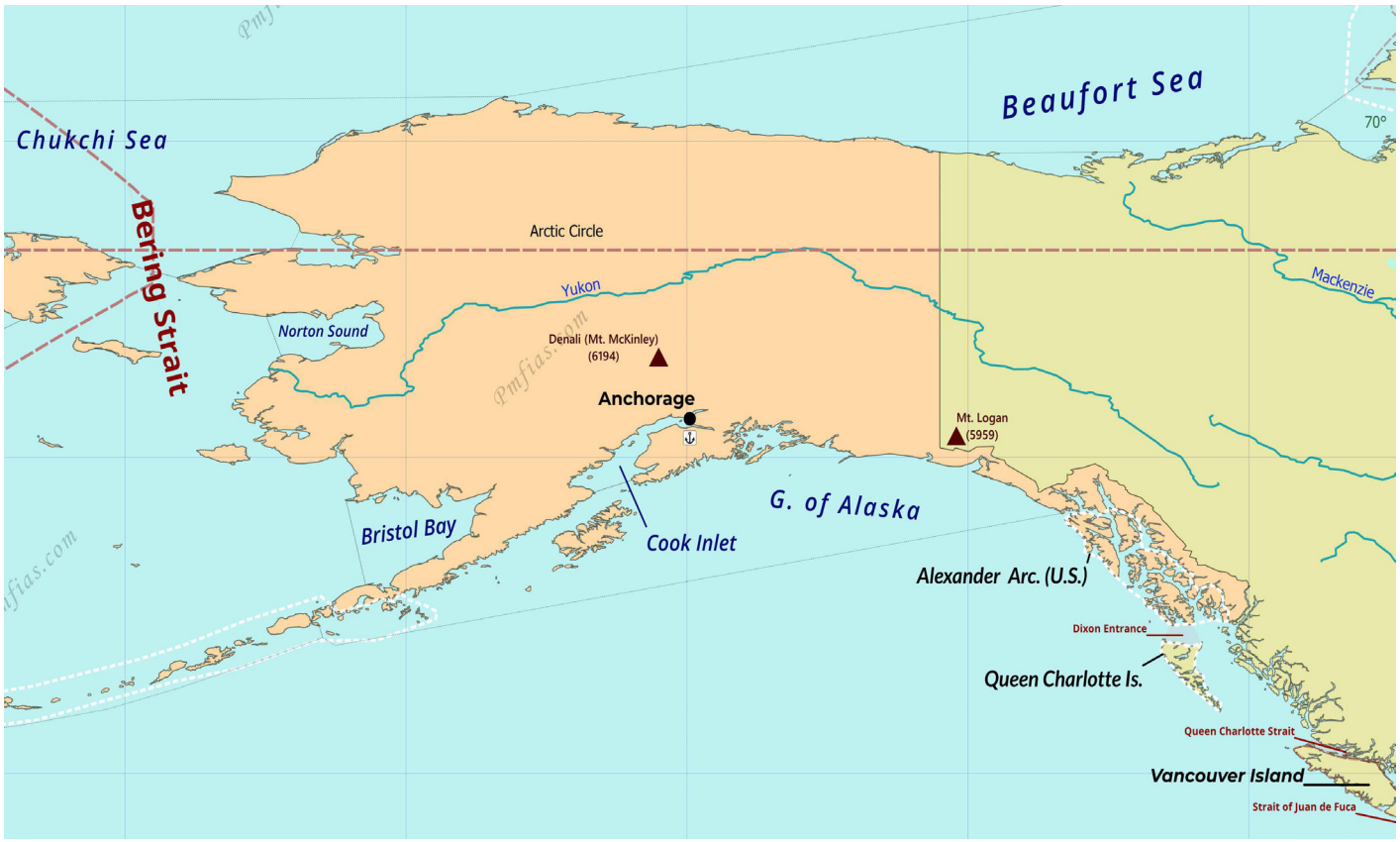
3.4.4. Alaskan Mountains

- The Alaskan Mountains, comprising three principal mountain groups (**Brooks Range**, **Alaska Range**, and **Aleutian Range)**, are located in the northwestern part of North America, within the U.S. state of **Alaska**. These mountains continue the **Rocky Mountains** and the Pacific Mountain system.

The Brooks Range and Arctic Foothills

- The Brooks Range, the northernmost of the three major Alaskan mountain groups, extends in an **east-west arc** from the Canadian border across northern Alaska. It is the **drainage divide** between waters flowing into the Arctic Ocean, Kotzebue Sound, and the **Yukon River** drainage system. The entire area has been glaciated, resulting in exceedingly **rugged topography**.


M'Clure Strait
Banks Island
Beaufort Sea
Amundsen Gulf
70°
Chukchi Sea
Alaska North Slope
Brooks R.
Mackenzie
Bering Strait
Arctic Circle
Chukchi Peninsula
Seward Peninsula
Norton Sound
Yukon
Yukon Flats
Great Bear Lake
Alaska R.
Yukon Plateau
Mackenzie Mts.
60°
G. of Anadyr
Bristol Bay
Alaska Peninsula
Cook Inlet
G. of Alaska
Alexander Arc. (U.S.)
Dixon Entrance
Queen Charlotte Is.
Coast Mts.
Fraser Plateau
Columbia Mountain
Queen Charlotte Strait
Aleutian Trench
50°
Vancouver Island
Strait of Georgia
Strait of Juan de Fuca
Columbia
Salish Sea
Cascade R.
Columbia Plateau
Coast R.
Black Rock Desert
40°
Sierra Nevada
Central Valley
Great Basin
San Francisco Bay


Beaufort Sea
70°
Chukchi Sea
Bering Strait
Arctic Circle
Yukon
Mackenzie
Norton Sound
Denali (Mt. McKinley)
(6194)
Anchorage
Mt. Logan
(5959)
G. of Alaska
Bristol Bay
Cook Inlet
Alexander Arc. (U.S.)
Dixon Entrance
Queen Charlotte Is.
Queen Charlotte Strait
Vancouver Island
Strait of Juan de Fuca

Central Alaska's Highlands and River Basins

- Central Alaska is characterised by **highlands and basins** drained by the **Yukon** and **Kuskokwim River** systems and resembles a moister and colder version of the arid Great Basin region. It features intricately dissected uplands divided into the eastern highlands, western highlands, and the **Seward Peninsula**.

The Southern Mountain Ranges

- These ranges include the Alaska Range, Aleutian Range, etc. The **Alaska Range** features **North America's highest peak**, **Denali (6,190 m)**. The range is a drainage divide for rivers flowing into the Yukon and the Gulf of Alaska. The **Aleutian Range**, with over 80 volcanoes, includes the Valley of Ten Thousand Smokes, formed by a 1912 eruption.

The Gulf of Alaska and the Southeastern Panhandle

- The **Kenai** and **Chugach** mountains are part of a mountainous belt encircling the Gulf of Alaska from Kodiak Island to Baranof Island. These ranges, which are heavily glaciated and rugged, form a barrier along the Pacific Ocean.

Panhandle

- It refers to a **narrow strip of territory that extends from the main body** of a larger geographical area, resembling a pan handle. E.g. **Alaska Panhandle**. It is often used to describe such **extensions** in the context of states, provinces, or countries.

3.4.5. Pacific Mountain System

- The Pacific Mountain system is a **series of mountain ranges** stretching along the Pacific Ocean coast of North America, from northern British Columbia in Canada to northwestern Mexico. From north to south, they include the **Coast Mountains of British Columbia**, the **mountains of Vancouver Island and the Queen Charlotte Islands**, the **Cascade Range**, the **Olympic Mountains**, the **Coast Ranges of Washington and Oregon**, the **Klamath Mountains**, the **Coast Ranges of California**, and the **Transverse Ranges**. The **Sierra Nevada** in eastern California is often considered part of this system.

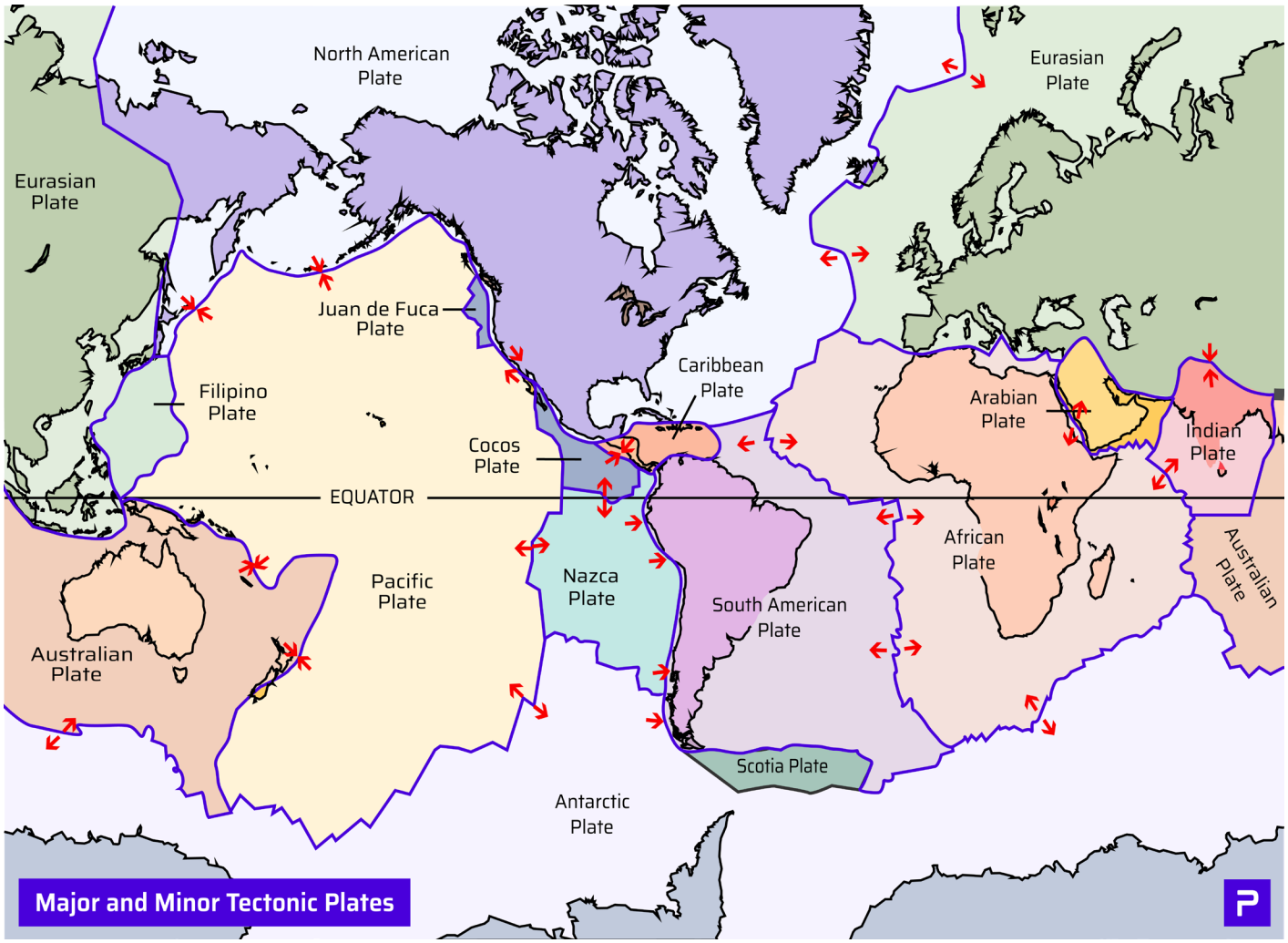
Cascade Mountain System

- The Cascade Mountain system stretches from northern California to central British Columbia. The range is predominantly **volcanic**, shaped by the **Cascadia subduction zone**, where the **Juan de Fuca Plate** is subducted beneath the **North American Plate**. This process generates magma by melting mantle rocks, fuelling the Cascade volcanoes. The range is part of the **Pacific Ocean's Ring of Fire**.

Yellowstone Caldera

- Yellowstone Caldera is an immense **crater** in northwestern **Wyoming's Yellowstone National Park** and was formed by a massive volcanic eruption around 640,000 years ago.

- The region has experienced three significant eruptions, the first 2.1 million years ago and the second 800,000 years later, with Yellowstone Caldera being the largest and youngest.
- **Yellowstone National Park** in the region is known for its geothermal features, like the Old Faithful Geyser, and rich wildlife. The park sits atop a **super volcano** capable of producing magnitude 8 eruptions.



3.4.6. Sierra Nevada

- The Sierra Nevada is a mighty mountain range along **California's eastern edge**. It extends northward 400 km from the **Mojave Desert** into the **Cascade Range**, separating the Central Valley from the Basin and Range Province. It is an **asymmetrical range**, with the highest peaks and eastern escarpment tilted along a central fault zone. **Mt. Whitney** is the highest peak (4,421 m).

[UPSC 2005] Where is the volcanic mountain, Mount St. Helens, located?

a) Chile
b) Japan
c) Philippines
d) United States of America

Answer: d) United States of America

[UPSC 1999] Match List-I with List-II and select the correct answer using the codes given below the lists

List-I (Volcanic Mountain)	List-II (Country)
A. Mt. Rainier	1. Italy
B. Etna	2. Mexico
C. Paricutin	3. Philippines
D. Taal	4. U.S.A.

Codes:

a) A-4; B-2; C-1; D-3

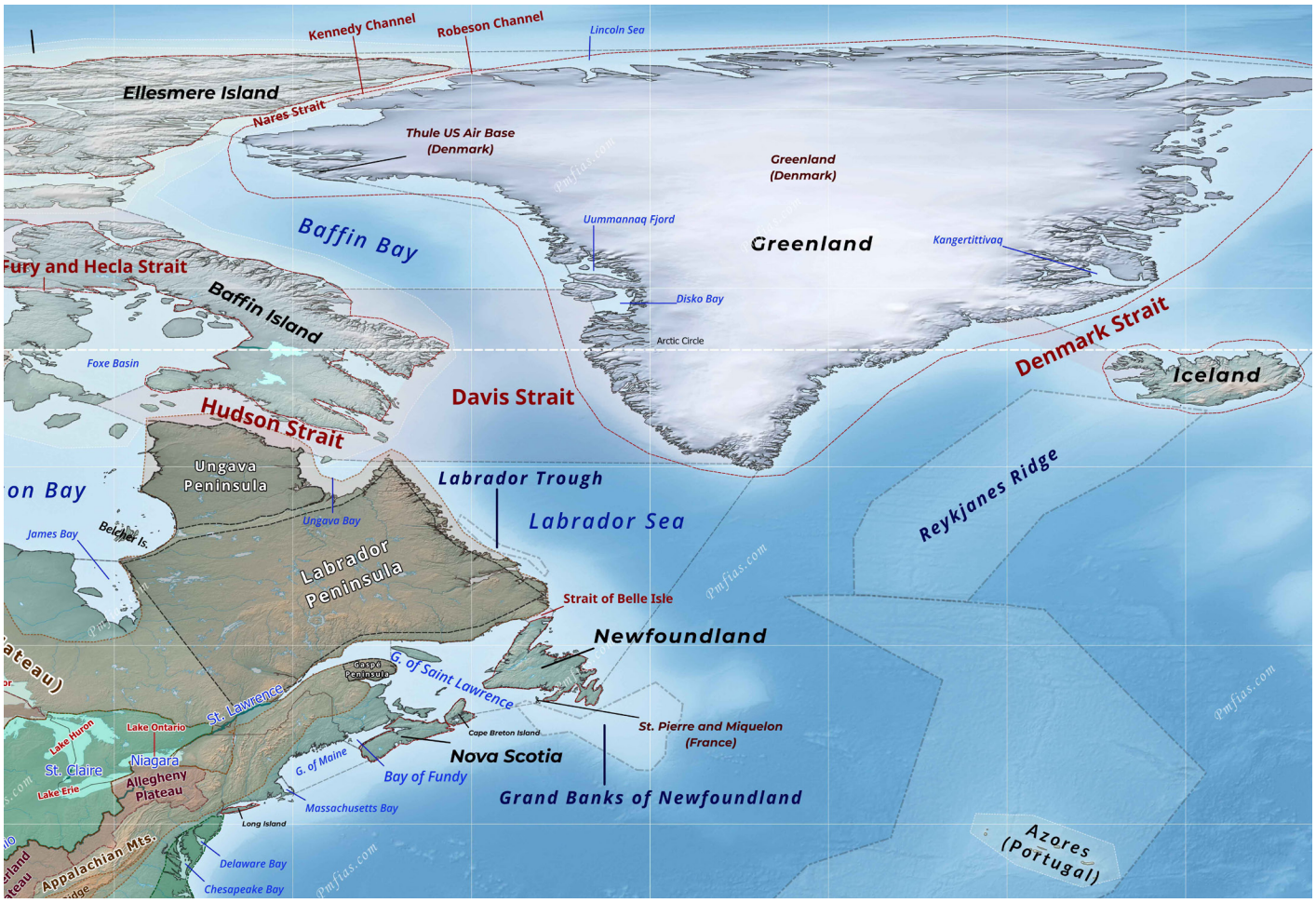
b) A-4; B-1; C-2; D-3

c) A-2; B-1; C-4; D-3

d) A-4; B-3; C-2; D-1

Answer: b) A-4; B-1; C-2; D-3

3.5. Major Islands/Island Groups of North America

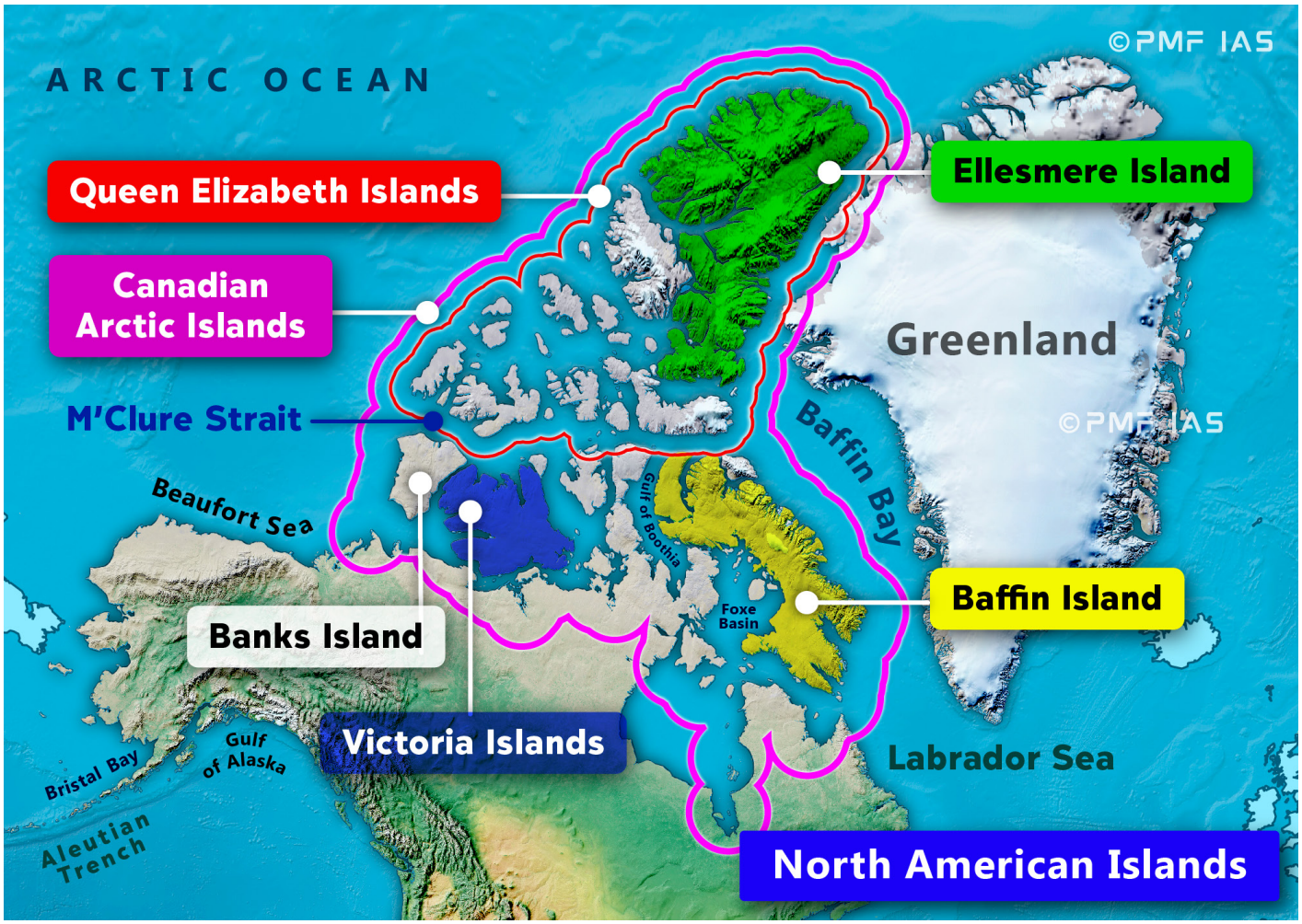


3.5.1. Greenland

- **Greenland is the world's largest island**. It is an **autonomous territory** within the **Kingdom of Denmark** (defence and foreign policy). The permanent ice sheet covers three-quarters of Greenland.
- With a population of about 56,000, it is the **least densely populated territory in the world**.
- **Nuuk** is the capital and largest city of Greenland.
- The majority of its residents are **Inuit** (indigenous peoples inhabiting Greenland, Canada and Alaska).
- **Thule Air Base in Greenland** is the **United States Air Force's northernmost base**.

3.5.2. Canadian Arctic Archipelago

- The Arctic Archipelago is a group of islands lying north of the Canadian continental mainland, excluding Greenland (an autonomous territory of Denmark). **Baffin Island is the largest island in Canada** and the world's 5th largest island. Other important islands are **Victoria Island** (the world's 8th largest island) and **Ellesmere Island** (the world's 10th largest island).

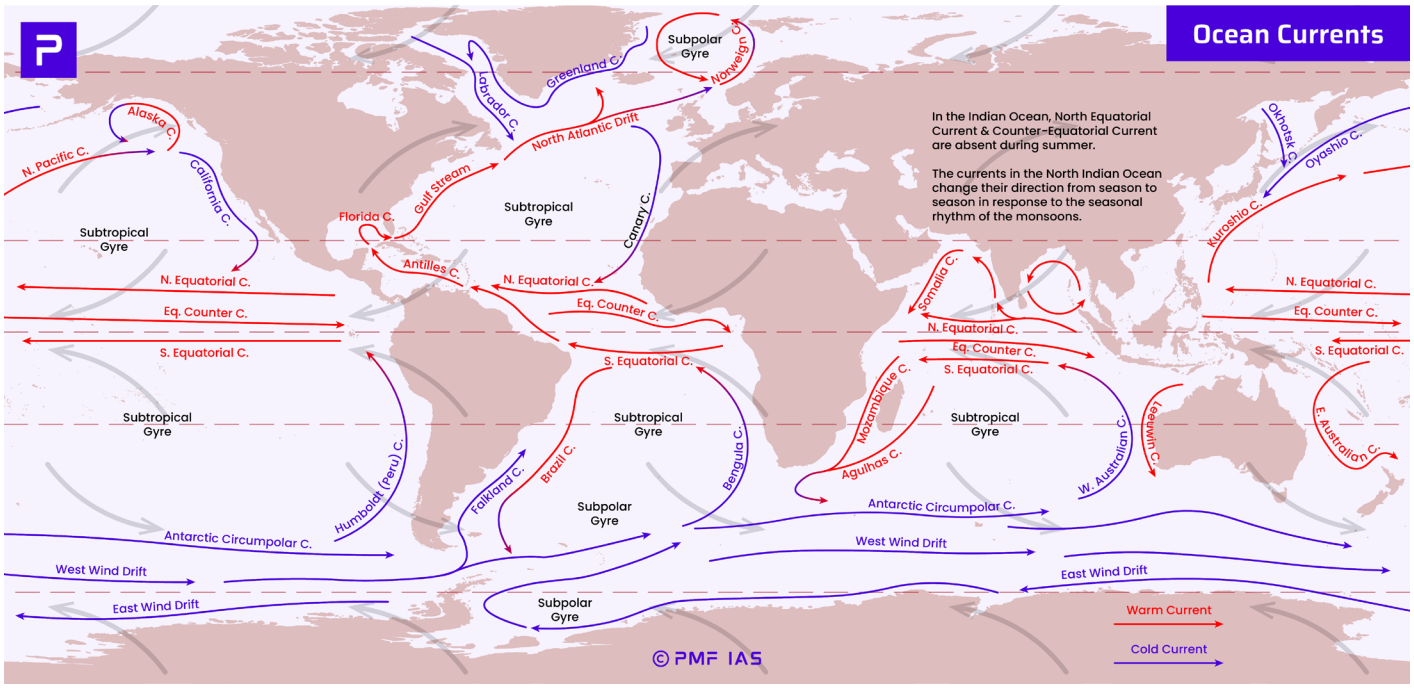


3.5.3. Newfoundland

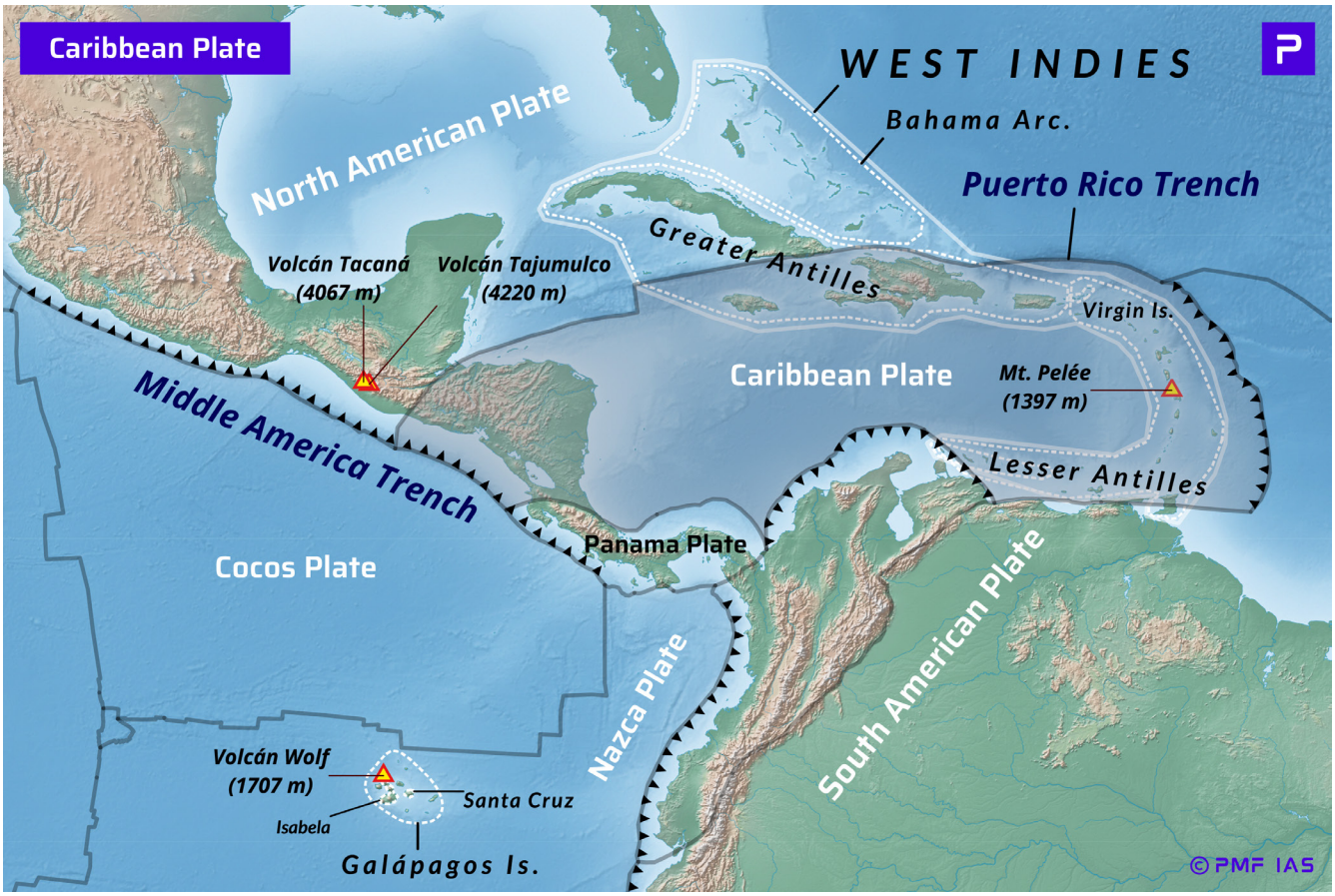
- The island is separated from the **Labrador Peninsula** by the **Strait of Belle Isle** and from Cape Breton Island by the **Cabot Strait**.

The Grand Banks

- The **Grand Banks of Newfoundland** are a **series of underwater plateaus** southeast of the island of Newfoundland on the North American continental shelf. The Grand Banks are **one of the world's richest fishing grounds** (the **cold Labrador Current** and the **warm Gulf Stream** meet here).



3.5.4. Antilles



- The Antillean islands are divided into two groupings: The **Greater Antilles (made up of continental rock)** and the **Lesser Antilles (primarily young volcanic or coral islands)**.

- The Greater Antilles comprise the four largest islands of the Antilles — **Cuba**, **Hispaniola (Dominican Republic and Haiti)**, **Jamaica**, and **Puerto Rico** — as well as their outlying islands and the **Cayman Islands**. These islands make up nearly 90 per cent of the total land area of the entire **West Indies**.
- The Greater Antilles and the Puerto Rico Trench are formed due to the complex interaction between **Caribbean Plate** and the North American Plate.
- The Lesser Antilles form a long **arc of small islands** in the **Caribbean Sea**, stretching north-south from the **Virgin Islands** to **Grenada**.
- Based on the prevailing easterly trade winds, the Lesser Antilles are divided into the **Windward Islands** and the **Leeward Islands**. The east-west chain of islands near the South American coast, known as the **Leeward Antilles**, is arid because the **trade winds drop their moisture on the Windward group**.

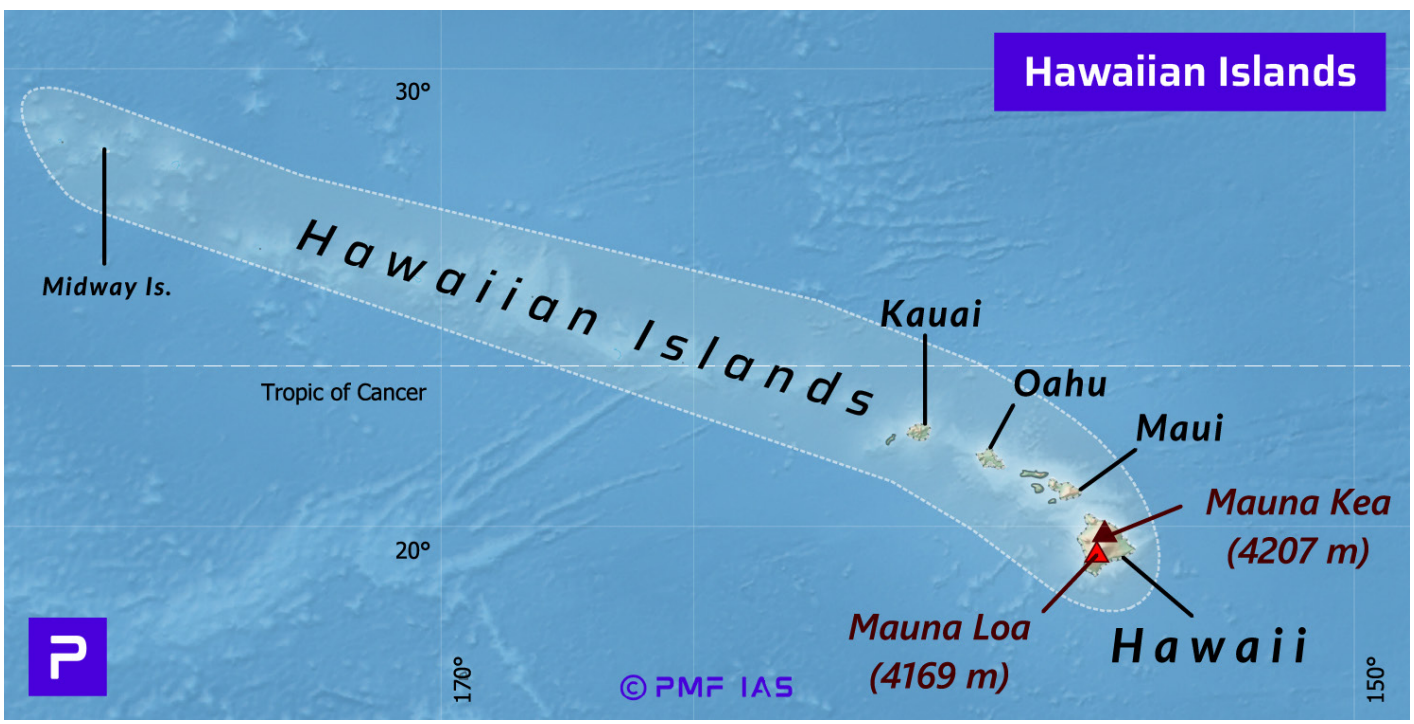
Lucayan Archipelago

- The Lucayan Archipelago consists of **the Bahamas** and **the Turks** and **Caicos Islands (UK)**. It is usually not included in the Greater Antilles.

West Indies

- The West Indies is the subregion that includes **all the Antilles and Lucayan Archipelago islands**.
- Nowadays, the term West Indies is often interchangeable with the term Caribbean, although the latter may also include some North and South American mainland countries with Caribbean coastlines.

3.5.5. Hawaiian Islands



- The Hawaiian Islands are an **archipelago of eight major islands**, several atolls, and seamounts in the North Pacific. They are the exposed peaks of a great undersea mountain range known as the **Hawaiian-Emperor seamount chain**, formed by **volcanic activity over a hotspot in the Earth's mantle**.

- **Hawaii is the biggest and youngest island in the chain**, built from five volcanoes. **Mauna Loa**, taking up over half of the Big Island, is the **largest shield volcano on Earth**.
- The Hawaiian Islands have many earthquakes, generally **caused by volcanic activity**. The majority of eruptions in Hawaii are Hawaiian-type eruptions **(fluid basaltic magma)**.

Mauna Kea

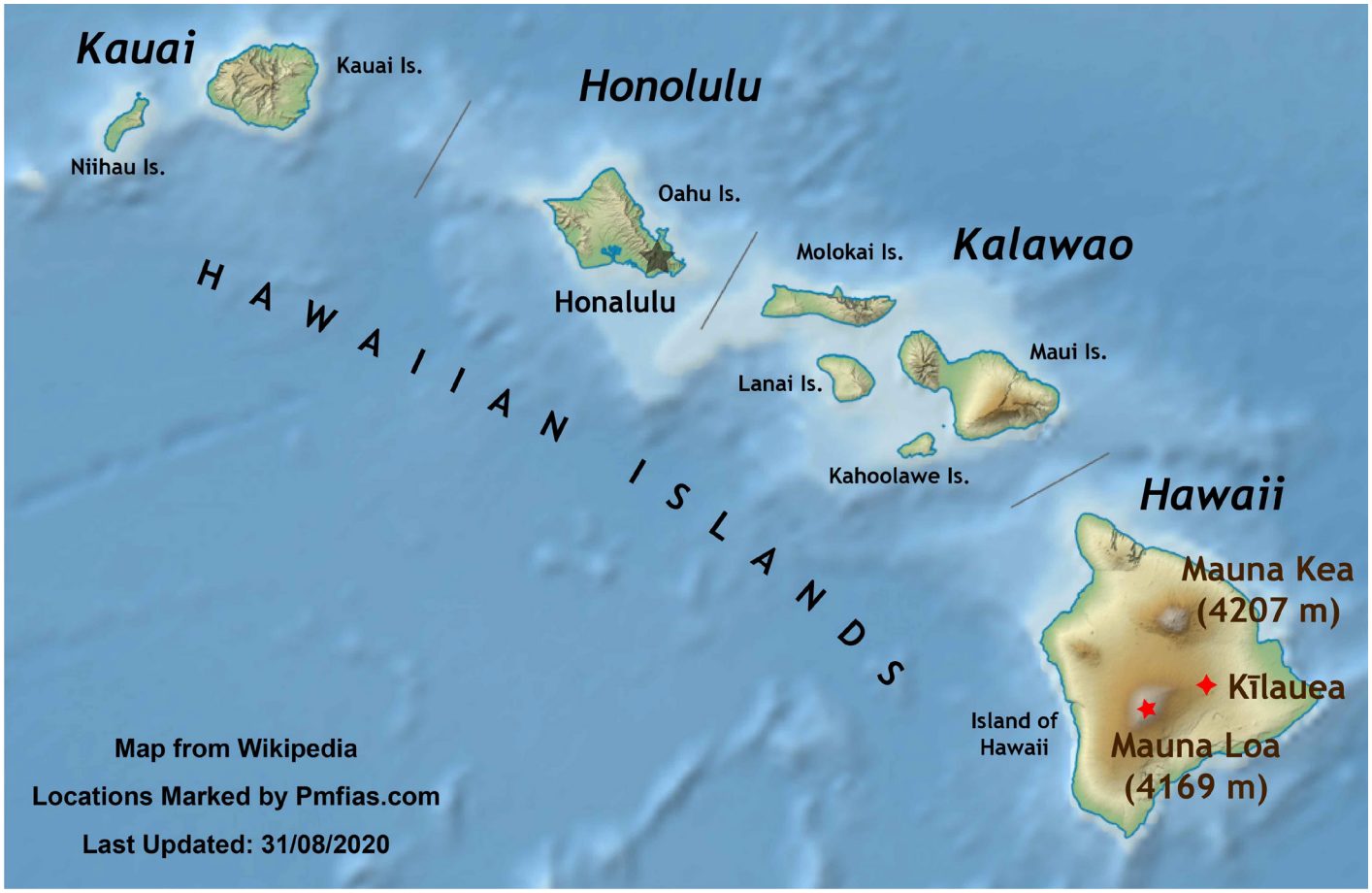
- **Mauna Kea (4169)** is a **dormant volcano** and the **highest point in the state of Hawaii**. When measured from its underwater base, **Mauna Kea is the tallest mountain in the world (~10 km)**.
- With its **high elevation**, **dry environment**, and **stable airflow**, Mauna Kea's summit is **one of the best sites in the world for astronomical observation**. **Numerous telescopes** have been constructed at the summit. Their construction on a sacred landscape by Native Hawaiians continues to be controversial.

Mauna Loa

- **Mauna Loa** is an **active shield volcano** with a relatively gentle slope. Its most recent eruption occurred in 2022. Lava eruptions here are **silica-poor and very fluid**, and they **tend to be non-explosive**.

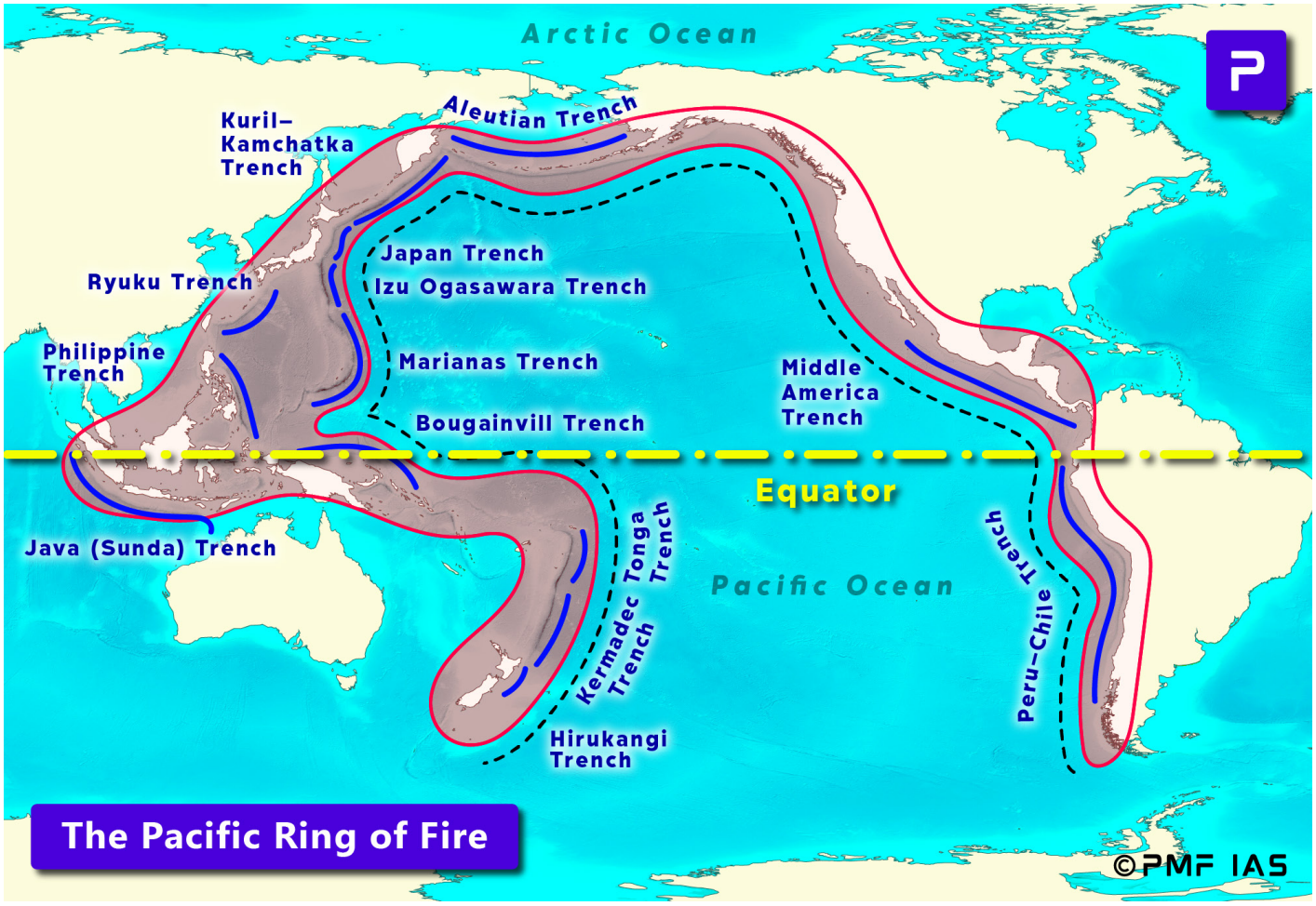
Kīlauea

- **Kīlauea** is an **active shield volcano** in the Hawaiian Islands that last erupted in 2018. Historically, **Kīlauea is the most active** of the five volcanoes that together form the island of Hawaii.



3.5.6. Aleutian Islands

- Aleutian Islands are a chain of **14 large volcanic islands** and 55 smaller islands. They form part of the **Aleutian Arc**, the **northernmost part of the Pacific Ring of Fire**, in the Northern Pacific Ocean, which separates **the Bering Sea (north)** from the main portion of the Pacific Ocean (south).
- Most of the Aleutian Islands belong to the **U.S. state of Alaska**, but some belong to Russia.



[UPSC 2008] Which one of the following straits is nearest to the International Date Line

a) Malacca Strait
b) Bering Strait
c) Strait of Florida
d) Strait of Gibraltar

Explanation

- A **narrow passage** between **Alaska** and **Russia**, historically significant as a **migration route** for early humans into North America.

Answer: b) Bering Strait

3.6. Other Important Geographic Regions of North America

3.6.1. Great Plains

- The Great Plains is a **vast high plateau of semiarid grassland** in **North America**, extending from the **Rio Grande** in the south to the **delta of the Mackenzie River** at the Arctic Ocean in the north. It is bordered by the Interior Lowland, the Canadian Shield to the east, and the **Rockies** to the west.
- It spans parts of **ten U.S. states** and **three Prairie Provinces of Canada** (Manitoba, Saskatchewan, and Alberta) and portions of the **Northwest Territories**. It occupies roughly **one-third of the USA**.
- They are **neither uniformly flat nor a featureless expanse**. For example, the **Llano Estacado (Staked Plains) in western Texas** is incredibly flat; at the same time, other areas feature tree-covered mountains, such as the **Judith Mountains of Montana**, rising 1,500 to 2,000 feet above the plains.

- In the United States, the **Missouri River** and its tributaries (the Yellowstone, Platte, and Kansas rivers) and the Red, Rio Grande, and Arkansas rivers drain the Plains region. The primary drainage system in Canada is the **Saskatchewan River** and its tributaries.

3.6.2. Great Basin

- The Great Basin is a distinctive natural feature of **western North America**, characterised by rugged north-south-trending **mountain blocks** and broad **intervening valleys**. It is bordered by the **Sierra Nevada range** to the west, the **Wasatch Mountains** to the east, the **Columbia Plateau** to the north, and the **Mojave Desert** to the south.
- Along with the Sonoran, Chihuahuan, and Mojave deserts, the Great Basin forms one of the four divisions of the **North American Desert**.
- The Great Basin is notable for its **internal drainage system**, where precipitation does not flow to the sea but ends in closed valleys. For example, the **Humboldt River** in northern Nevada (USA) rises in the north-east, drains several small valleys, and terminates in the **Humboldt Sink**, **a closed basin**.

3.6.3. Canadian Shield

- The Canadian Shield, one of the world's largest **geologic continental shields**, spans ~8 million square km across eastern, central, and northwestern Canada, extending into Greenland and parts of the northern U.S. states, including Minnesota, Wisconsin, Michigan, and New York.
- It comprises the largest expanse of exposed **Precambrian rock**, characterised by ancient crystalline formations shaped by extensive geological processes such as uplift, mountain building, and erosion.

3.6.4. San Andreas Fault

- The San Andreas Fault is a **transform boundary** between the **Pacific and North American Plates**, running through California from Cape Mendocino to the Mexican border.
- Cities like **San Diego** and **Los Angeles** sit on the Pacific Plate, while **San Francisco** and **Sacramento** lie on the North American Plate. Though famous for the 1906 earthquake, the fault does not pass directly through San Francisco but affects towns like Desert Hot Springs and San Bernardino.
- The fault is visible in places like **Carrizo Plain** and **Olema Trough** as scarps and pressure ridges. Elsewhere, it may be obscured by alluvium or vegetation.

3.6.5. Dependent/Overseas Territories in North America

Dependent Territories of the UK	***Dependent Territories of France***
✓ Anguilla (Lesser Antilles)	✓ Guadeloupe (Lesser Antilles)
✓ Bermuda	✓ Martinique (Lesser Antilles)
✓ British Virgin Islands (Lesser Antilles)	✓ Saint Barthélemy (near Anguilla in the Lesser Antilles)
✓ Cayman Islands (Greater Antilles)	✓ Saint Martin (near Anguilla in the Lesser Antilles)

✓ Montserrat (Lesser Antilles)	✓ Saint Pierre and Miquelon (near Newfoundland)
✓ Turks and Caicos Islands (Lucayan Archipelago)	***Dependent Territories of the Netherlands***
Dependent Territories of the US	✓ Caribbean Netherlands (Leeward Antilles)
✓ Puerto Rico (Greater Antilles)	✓ Sint Maarten (near Anguilla in Lesser Antilles)
✓ United States Virgin Islands (Lesser Antilles)	Others: Greenland (Kingdom of Denmark)

3.6.6. Central America

- Central America is the southernmost region of North America, between Mexico and South America. It comprises **seven countries**: El Salvador, Costa Rica, Belize, Guatemala, Honduras, Nicaragua, and Panama.
- It is a part of the **Mesoamerican biodiversity hotspot**. The region features **humid swamps and lowlands** along both coasts, but about 80% of Central America is hilly or mountainous.

Yucatan Peninsula

- The **Yucatan Peninsula** projects north-eastward from Central America, situated between the Gulf of Mexico and the Caribbean Sea. It encompasses three **Mexican states** (Campeche, Quintana Roo, and Yucatan) and portions of **Belize** and **Guatemala**.
- The peninsula primarily consists of **coralline and porous limestone**, forming a gradually rising tableland toward the south. A thin layer of dry soil, created through coral rock weathering, covers the surface.
- The limestone terrain features natural **sinkholes** and **caverns**, which the **Mayan civilisation** utilised for building their cities and ceremonial centres.

[UPSC 2006] Bermuda Triangle extends up to which of the following places?

1. Southern Florida
2. Puerto Rico
3. Hawaiian Islands

Select the correct answer using the codes given below:

a) 1, 2 and 3
b) 1 and 2 only
c) 2 and 3 only

d) 1 and 3 only

Explanation

- The Bermuda Triangle is a region in the **western part North Atlantic Ocean** off the coast of North America. In this region, ships, planes, and people are alleged to have mysteriously vanished.
- While supernatural theories range from alien abductions to Atlantis's influence, scientific evidence points to more natural explanations.
- **Environmental Factors:**
  - The region experiences frequent tropical storms and hurricanes
  - Gulf Stream causes sudden weather changes
  - The Caribbean's shallow waters pose navigational hazards
  - Compass variations between true and magnetic north occur in the area

Answer: b) 1 and 2 only

[UPSC 2005] Which one of the following pairs is not correctly matched?

a) Bahamas: Nassau
b) Costa Rica: San Jose
c) Nicaragua: Balmopan
d) Dominican Republic: Santo Domingo

Answer: Nicaragua : Balmopan

[UPSC 2004] Which one of the following does not border Panama?

a) Coast Rica
b) Pacific Ocean
c) Colombia
d) Venezuela

Answer: d) Venezuela

[UPSC 1995] The standard time of the following countries is ahead of or behind Greenwich Mean Time depending on whether they are East or West of the longitude passing through Greenwich.

1. Cuba
2. Greece
3. Iraq
4. Costa Rica
5. Japan

Which one of the following sequential orders gives the correct arrangement of the countries according to their standard time from ahead to behind GMT?

a) 5, 3, 2, 1, 4
b) 2, 4, 1, 3, 5
c) 4, 1, 3, 2, 5
d) 3, 5, 4, 1, 2

Answer: a) 5, 3, 2, 1, 4

3.7. Recently In The News

3.7.1. State of Emergency in Trinidad and Tobago

- Recently, Trinidad and Tobago declared a state of emergency following a deadly violence.
- Trinidad and Tobago is an **island nation** in the **southeastern West Indies**, comprising the main islands of **Trinidad** and **Tobago** along with several smaller ones. It forms the **southernmost part of the Caribbean Island chain** and lies northeast of Venezuela and northwest of Guyana.
- **Capital:** Port of Spain.
- **Pitch Lake:** located on the coast of Trinidad, it is the **largest natural asphalt deposit** in the world.

3.7.2. Hurricane Beryl and Hurricane Milton

- **Hurricane Beryl** and **Hurricane Milton** were deadly and destructive **Category 5** tropical cyclones that impacted parts of the Caribbean, the Yucatán Peninsula, and the United States Gulf Coast in 2024.
- Hurricane Beryl struck the region in June-July 2024, whereas **Hurricane Milton** struck in October 2024.

3.7.3. Operation Indravati | Haiti

- India evacuated its citizens from turmoil-stricken **Haiti** to the neighbouring **Dominican Republic**.
- **Haiti** is the **second largest Caribbean Island**. Port-au-Prince is its capital. It is bordered to the east by the **Dominican Republic**, which covers the rest of **Hispaniola**.

3.7.4. Badwater Basin in Death Valley

- It is an **endorheic ephemeral Lake** (a temporary body of water that appears/disappears based on specific conditions) situated in **Death Valley**, **North America's driest place and lowest elevation point**. It is only 84.6 miles east-southeast of **Mount Whitney**, the highest point in the United States.
- Hurricane Hilary (2003) triggered the formation of a lake in **Badwater Basin**. In February 2024, an atmospheric river replenished the lake's waters.

3.7.5. Darien Gap

- **Darien Gap** is a mountainous forested marshland between **Panama** and **Colombia** in the **Isthmus of Darién** or **Isthmus of Panama**. The **Pan-American Highway** does not traverse Darien, effectively blocking land transportation between Central and South America. However, it is one of the world's fastest-growing border crossings and a part of the **Donkey Route** to the USA.

What is Donkey Route?

- The "donkey route" to the United States involves migrants travelling through **Latin American countries** to reach the US border. The journey often starts in countries like **Ecuador**, **Bolivia**, or **Guyana**, where Indian citizens can obtain visas quickly.
- The route includes crossing the Darien Gap, facing risks such as lack of clean water, wildlife, and criminal gangs. From Panama, migrants are often routed through Guatemala to enter Mexico and eventually reach the US border, facing challenges like jumping fences and crossing the **Rio Grande River**.

Pan-American Highway

- The Pan-American Highway is a system of roads measuring about 30,000 km in length. It **runs north–south** through North, Central and South America. Darién Gap is the sole 106 km exception.

3.7.6. Fuego Volcano Eruption

- The **Fuego volcano** in **Guatemala** erupted recently.
- **Name and Location:** "**Volcano of Fire**" (Spanish: Volcán de Fuego) near Antigua.
- **Activity:** Among the most active volcanoes in **Central America**, part of the Pacific Ring of Fire.
- **Eruption History:** Has a history of violent eruptions dating back to the 16th century. The 2018 eruption killed 194 people and left 234 missing.
- **Eruptive Style:** Characterised by explosive events, lava flows, and pyroclastic flows.

3.7.7. Lake Erie

- Water infected with **Microcystin** in **Lake Erie** can be harmful.

About Lake Erie

- **Location:** One of North America's Great Lakes, situated on the border between the U.S. and Canada.
- **Size:** It is the fourth-largest among the five Great Lakes.
- The main contributing rivers include the **Detroit**, **Huron**, and **Raisin** rivers.
- The **Niagara River** serves as its eastern discharge point.
- **Economic Role:** Commercial fishing, tourism, and shipping; Major ports include Cleveland and Toledo.
- **Ecological Threats:** Faces pollution, invasive species, and algal blooms, posing risks to water quality.

3.7.8. Lake Gatun

- The **Panama Canal**, an important shipping lane around the world, faces an existential threat due to a fall in the level of **Lake Gatun**, an artificial water reservoir vital to the operation of the canal system.
- Lake Gatun was formed by damming the **Chagres River** and its smaller affluents at **Gatun**. The lake's primary function is to **hold sufficient water in the Gaillard Cut** to the south for canal passage and use in the canal's locks during dry spells. **Guacha Island** is present in the centre of the lake.

3.7.9. Potomac River

- An American Airlines plane collided with an Army helicopter, crashing into the **Potomac River**.
- **Source:** Green Spring, West Virginia, USA.
- **Mouth:** Chesapeake Bay (Atlantic Ocean), Virginia, USA.
- **Important Cities:** **Washington**, **D.C**.

Sister River

- The **Arakawa**, originating from **Mount Kobushi** (Japan) and flowing into **Tokyo Bay**, was officially designated as the **Sister River** of the Potomac River. Both rivers flow through their nations' capital cities (Washington, D.C. and Tokyo) and share a unique cultural bond through **cherry blossoms**, which bloom along both riverbanks.
- The **Sister River concept** (similar to **Sister City partnerships**) links rivers across countries to foster cultural, environmental, and informational exchange, promoting international cooperation among ecologically or geographically similar communities.

3.7.10. Renaming of North America's Highest Peak

- President Trump's executive order mandates the renaming of North America's highest peak, reversing the Obama-era decision to call it **Denali**, citing the historical significance of President **McKinley**. Denali National Park retains its name despite the mountain's renaming.

Geographical and Ecological Significance

- **Location:** In the Alaska Range, Alaska, USA.
- **Height:** Stands at 6,190 meters above sea level, the highest point in North America.
- **Ecology:** The surrounding Denali National Park and Preserve hosts diverse ecosystems, including tundra, glaciers, and mountain forests.

---------- End of Chapter ----------

4. South America

Map from Wikipedia
Locations Marked by Pmfias.com
Caribbean Sea
Punta Gallinas
L. Maracaibo
Llanos
Orinoco River
Angel Falls
Guiana Highlands
Guiana Space Centre
Andes Mountains
Amazon River
Amazon Basin
Punta Pariñas (Punta Balcones)
Ponta do Seixas (Cape Branco)
Carajás Mine (largest iron ore mine in the world)
Machu Picchu
L. Titicaca
Brazillian Highlands
Gran Chaco
Atacama Desert
Western Chile Range (Chilean Coast Range)
Mount Ojos del Salado (6893 m)
Mount Aconcagua (6960 m)
Paraná River
Pampas
Rio de la Plata
Patagonian Desert
Tierra del Fuego Archipelago
Strait of Magellan
Falkland Islands (UK)
South Georgia & South Sandwich Islands (UK)
Cape Forward
Beagle Channel
Cape Horn
Drake Passage
South Shetland Islands (Antarctica)
Scotia Sea

Area	• 17.84 million km^2 (4th largest continent)
Longitudinal Extent of the Mainland	• 81° W to 34° W (~5300 km — Point Pariñas (Peru) to Cape Branco (Brazil))
Latitudinal Extent of the Mainland	• 12° N to 55° S (~7560 km — Point Gallinas (Colombia) to Cape Horn (Chile))
Sovereign Countries (12)	• **In decreasing order of area: Brazil (8.5 million km^2 – 5th largest country in the world)**, **Argentina**, Peru, Colombia, Bolivia, Venezuela, Chile, Paraguay, Ecuador, Guyana, Uruguay and Suriname. • **In decreasing order of population: Brazil**, **Colombia**, **Argentina**, Peru and Venezuela.
Dependent Territories	• **French Guiana (France)**, **Falkland Islands (UK)** and **South Georgia and the South Sandwich Islands (UK)**
Major Cities	• Most of the population lives near the **continent's western or eastern coasts**. • **In decreasing order of population: São Paulo (Brazil)**, Lima (Peru), Bogotá (Colombia), Rio de Janeiro (Brazil), Santiago (Chile), Caracas (Venezuela), Buenos Aires (Argentina), Salvador (Brazil), Brasília (Brazil), Fortaleza (Brazil), etc.
Major Islands/Island groups	• **Galapagos Islands (Ecuador)**, **Tierra del Fuego Archipelago (Chile and Argentina)**, **Falkland Islands (UK)** and **South Georgia and the South Sandwich Islands (UK)**
Largest Lake	• **Lake Titicaca**
Highest Mountains	1. **Mount Aconcagua (6960 m)** 2. **Mount Ojos del Salado (6893 m) — the highest active volcano in the world**
Longest River	• **Amazon River** (6575 km)
Facts	• The **Andes** Mountains — the world's longest continental mountain range. • **Brazil** is the world's largest coffee producer. • **Landlocked Countries: Paraguay** and **Bolivia**. • **Pantanal (Brazil)** is the world's largest tropical wetland. • Argentina, Brazil, and Paraguay meet at the convergence of the Iguazu and **Paraná** rivers, the most prominent **tripoint (Triple Frontier)** in South America.

[UPSC 2007] Where is Copacabana Beach located?

a) Buenos Aires
b) Hawaiian Islands
c) Rio de Janeiro
d) Valletta

Answer: c) Rio de Janeiro

[UPSC 2003] Which one of the following countries is landlocked?

a) Bolivia
b) Peru
c) Surinam
d) Uruguay

Answer: a) Bolivia

[UPSC 1999] Physical regions marked as 1, 2, 3, and 4 on the given map are respectively:

a) Andes, Brazilian Shield, Guyana Highlands and Amazon Basin
b) Andes, Guyana Highlands, Brazilian Shield and Amazon Basin
c) Amazon Basin, Guyana Highlands, Brazilian Shield and Andes
d) Guyana Highlands, Brazilian Shield Andes and Amazon Basin

Answer: a) Andes, Brazilian Shield, Guyana Highlands and Amazon Basin

[UPSC 1999] Which one of the following port cities in Venezuela has been developed as an oil port?

a) Caracas
b) Maracaibo
c) Maracay
d) Carupano

Answer: b) Maracaibo

4.1. South America vs Latin America

South America	Latin America
• It is a continent located in the southern portion of the Western Hemisphere.	• It is a **cultural and linguistic region**.
• **12 sovereign states:** Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela.	• This includes **South American countries**, most of **Central America**, **Mexico**, and **several Caribbean islands**.
• **Portuguese** and **Spanish** are predominant. • Diverse cultures, including indigenous civilisations like the **Inca**, **Mapuche**, and **Guarani**, as well as Spanish and Portuguese influences.	• Predominantly **Spanish** and **Portuguese**, with **French** also spoken in some regions. • Shared cultural heritage rooted in the Latin traditions and influences of **European colonisation**, primarily Spain and Portugal, combined with indigenous and African influences.

4.2. Major Rivers of South America

4.2.1. Amazon River

- The Amazon River is the **second longest** (~6,400 km) river in the world and the **largest** river by discharge volume of water globally.

Source	• **Mantaro River** in **southwestern Peru**.
Mouth	• Atlantic Ocean, Brazil.
Drainage Basin Countries	• Peru, Colombia, and Brazil.
Main Tributaries	• **Madeira**, Araguaia, **Jurua**, and Rio Negra.
Important Cities	• Iquitos (Peru), Macapá (Brazil), and Manaus (Brazil).

Amazon Rainforest

- The Amazon basin is a part of South America drained by the Amazon River and its tributaries. It supports the **world's largest rainforest**, which accounts for **more than half the total volume of rainforests**. It houses at least **10% of the world's known biodiversity**.
- The Amazon basin is spread over parts of **Brazil (60%)**, **Bolivia**, Colombia, Ecuador, Guyana, **Peru**, Suriname and Venezuela. It encompasses 7 million km^2, of which the rainforest covers 5.5 million km^2.
- More than 50% of the dust fertilising the Amazon rainforest comes from the depression in **Northern Chad** in the Sahara Desert. The dust contains **phosphorus**, which is important for plant growth.

Significance of the Amazon rainforest

- The Amazon rainforest is called the '**lungs of the Earth**' because it 'breathes in' CO_2 and 'exhales' oxygen on a massive scale. It contained 71.5 Bn tonnes of carbon (~double the global CO_2 emissions for 2022).
- The **Amazon's canopy cover** helps regulate temperature and humidity and is intricately linked to **regional climate patterns** through hydrological cycles that depend on the forests.
- It contributes significantly to Brazil's economy through products such as **rubber** and **timber**.

[UPSC 2007] Which one of the following rivers is the longest?

a) Amazon
b) Amur
c) Congo
d) Lena

Answer: a) Amazon

4.2.2. Parana River

- The Parana River is South America's **second longest** river (4,880 km).

Source	• Confluence of the **Rio Grande** and **Paranaíba rivers**, South Brazil.
Mouth	• **Río de la Plata estuary**, Uruguay, **Atlantic Ocean**. (The confluence of the **Parana** and **Uruguay** Rivers forms this estuary)
Drainage Basin	• Brazil, Paraguay, Bolivia, Argentina.
Main Tributaries	• **Paraguay** and **Uruguay**

Important Cities	• **Brasilia** and **São Paulo** (Brazil), **Asunción** (Paraguay), and **Buenos Aires** (Argentina).
Major Dams	• **Itaipú Dam**

[UPSC 2005] Itaipu Dam, built on the river Parana, is one of the largest dams in the world. Which of the following two countries have this as a joint project?

a) Brazil and Peru
b) Paraguay and Ecuador
c) Brazil and Paraguay
d) Colombia and Paraguay

Answer: c) Brazil and Paraguay

Paraguay River

- The Paraguay River (2,550 km) is the **fifth largest river in South America** and the principal tributary of the Paraná River.

Source	• **Mato Grosso region**, Brazil.
Mouth	• Joins the **Paraná River** near the **Argentina-Paraguay border**.
Drainage Basin Countries	• Brazil, Paraguay, Bolivia, and Argentina.
Main Tributaries	• Rio Negro and Miranda.
Important Cities	• Corumbá (Brazil); Concepción (Paraguay); **Asunción** (Capital of Paraguay)

4.2.3. Uruguay River

- It flows westward through **Brazil's coastal range**. Then, it turns southwestward, forming the border between **Argentina** and **Brazil**. The river turns southward below Monte Caseros, Argentina, marking the border between **Argentina** and **Uruguay** until it merges with the **Paraná River**.

Source	• **Pelotas River**, Atlantic Coast, Santa Catarina state, Brazil. • The river takes the name Uruguay after being joined by the **Canoas River** near **Piratuba**.
Mouth	• **Río de la Plata estuary**, Uruguay, **Atlantic Ocean**.
Drainage Basin Countries	• Brazil, Argentina and Uruguay.
Main Tributaries	• Rio Negro
Important Cities	• **Salto** (Uruguay)
Important Dams/Reservoirs	• **Salto Grande Dam** and Ita Dam.

4.2.4. Orinoco River

- The Orinoco River (2,740 km) is a major river in South America. For most of its course, it flows through **Venezuela**, except for a section that forms part of the **Colombia-Venezuela border**.

- The Orinoco basin is South America's northernmost of the four major river systems (**Amazon**, **Río de la Plata**, **Orinoco**, and **São Francisco**). The **Andes** borders it to the west and north, the **Guiana Highlands** to the east, and the **Amazon Basin** to the south.
- Below the town of Esmeralda, some waters of the Orinoco River flow south into the **Casiquiare River**, also known as the **Casiquiare Channel**. This unique **natural passage** flows generally southward until it joins the **Guainía River**, forming the Negro River. This connection **links the Orinoco River system with the Amazon River system**, creating a rare natural waterway between two major river basins.

Source	• **Mount Delgado Chalbaud** in the Parima Mountains of Venezuela.
Mouth	• Delta Amacuro state, **Venezuela** (**Atlantic Ocean**)
Drainage Basin Countries	• Venezuela and Colombia.

Angel Falls

- **Angel Falls**, located in the **Guiana Highlands in Bolívar state**, **southeastern Venezuela**, is the **world's highest waterfall**. It is situated on the **Churún River**, a tributary of the **Caroní River** (a tributary of the **Orinoco River**). The waterfall leaps from the flat-topped plateau of **Auyán-Tepuí** ("**Devil's Mountain**").

4.2.5. São Francisco River

- The São Francisco (2,914 km) is a major river in **eastern South America**. It is the largest river **entirely contained within Brazil** and the **fourth-largest river system** in South America. It is referred to as the "**river of national unity**".

Source	• Eastern slope of the **Serra da Canastra** in Minas Gerais state, Brazil.
Mouth	• **Atlantic Ocean** near **Aracaju**.
Drainage Basin Countries	• Brazil
Important Dams/Reservoirs	• Sobradinho Reservoir

4.3. Major Mountains and Highlands in South America

- South America features two major mountain systems — the **Andes** and the **highlands of Brazil and Guiana**. The **Andes** is a geologically **young cordillera**. In contrast, the **ancient Guiana and Brazilian highlands** have **lower elevations** and **gently slope westward**. Farther south lies the **plateaus of Patagonia**.
- The continental landscape is **separated by vast lowland regions** that separate the highlands. These include the basins of the major rivers — the **Orinoco**, **Amazon**, and **Paraguay-Paraná** — as well as the **plains of the Pampas**.

4.3.1. Andes Mountains

- The Andes consist of a **vast series of high plateaus** topped by even **higher peaks**, forming an unbroken mountain chain extending approximately 8,900 km from the southern tip of South America to the continent's northernmost Caribbean coast.

- The convergence of the **South American Plate** and the **oceanic Nazca Plate** led to the mountain-building activity that created the Andes. The Andes are **not a single**, **continuous line of peaks** but a series of **parallel and transverse ranges**, or cordilleras, interspersed with plateaus and depressions. Generally, they are divided into:
  1. **<u>Southern Andes:</u>** Includes the Chilean, Fuegian, and Patagonian cordilleras.

2. **<u>Central Andes:</u>** Encompasses the Peruvian cordilleras.
3. **<u>Northern Andes:</u>** Covers the Ecuadorian, Colombian, and Venezuelan (or Caribbean) cordilleras.

Mount Aconcagua

- The Andes contain the **highest peak in the Western Hemisphere**, **Mount Aconcagua** (6,959 meters) on the **Argentina-Chile border**. The mountain is one of the **Seven Summits** of the seven continents.

Seven Summits of the Seven Continents

- The Seven Summits are the highest mountains of each of the seven continents.
  1. **<u>Asia:</u> Mount Everest** (8,850 meters)
  2. **<u>South America:</u> Mount Aconcagua** (6,960 m)

3. **North America:** **Denali** (also called **Mount McKinley**) (6,190 m)
4. **Africa:** **Kilimanjaro** (5,895 m)
5. **Europe:** **Mount Elbrus** (5,642 m)
6. **Antarctica:** **Vinson Massif** (4,892 m)
7. **Australia:** **Mount Kosciuszko** (2,228 m) (The Westerners consider mainland Australia a separate continent.)

- **Puncak Jaya Peak** (4884 m) in the **Indonesian part of New Guinea** Island is the **highest island peak on Earth**.

Mount Ojos Del Salado

- **Ojos del Salado is an active stratovolcano** in the Andes on the **Argentina-Chile border**. It is the **highest active volcano in the world** at 6,893 m. It is also the second-highest mountain in both the Western and Southern Hemispheres.

4.3.2. Brazilian Highlands

- The Brazilian Highlands is an **eroded plateau region** of **central and south-eastern Brazil**. **Ancient basaltic lava flows** gave birth to much of the region.
- The region comprises more than half of the country's landmass and settlements. It is the primary source of **Brazil's abundant mineral wealth**. The highlands are also significant for **coffee**, **sugarcane**, and other plantation agriculture.

Mato Grosso Plateau

- The Mato Grosso Plateau, an **ancient erosional plateau**, is part of the Brazilian Highlands. It acts as a **natural divide** between the basins of the Amazon River (north) and the Paraguay River (south). A mixture of savanna grasslands and woodland characterises the plateau.

4.3.3. Guiana Highlands

- The Guiana Highlands are a **plateau** and low-mountain region in South America, located **between** the **Amazon** and **Orinoco** rivers. They cover the **southern half of Venezuela**, the northern part of Brazil, and a portion of **eastern Colombia**. Geologically, they are similar to the Brazilian Highlands, from which they are **separated by the eastern Amazon lowlands**.
- The Guiana Highlands consist of three ascending elements: **Rolling Hilly Upland**, **Low Mountains**, and **Tabular Plateaus** (capped with resistant sandstone). The tabular plateaus form the highest elevations, such as **Mount Roraima** (2,772 meters), where the borders of Brazil, Venezuela, and Guyana converge.

Pacaraima Mountains

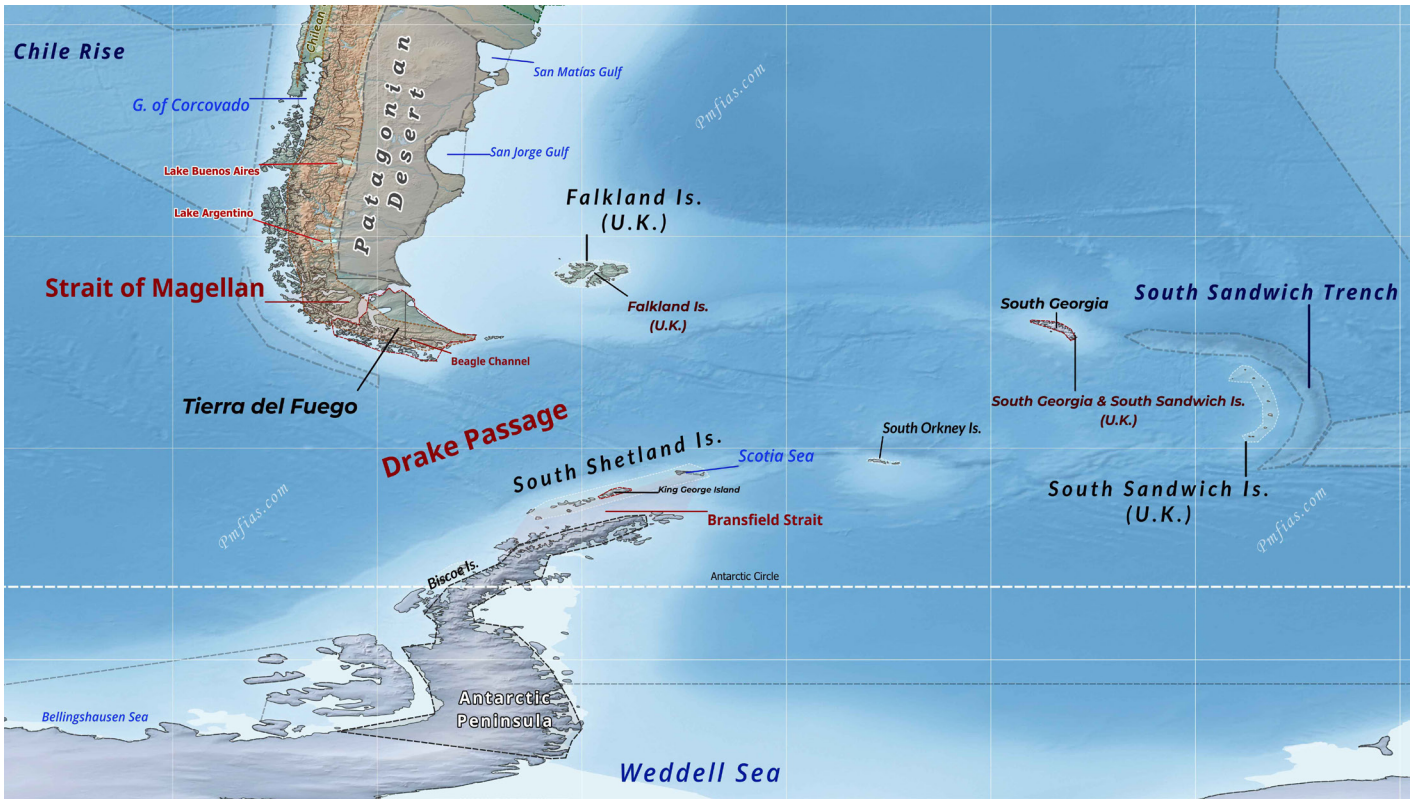
- The Pacaraima Mountains are the **central tabular upland of the Guiana Highlands**, spanning Brazil, Venezuela, and Guyana. These mountains serve as the **drainage divide** between the **Orinoco Valley** to the north and the **Amazon Basin** to the south.

4.4. Major Islands/Island Groups of South America

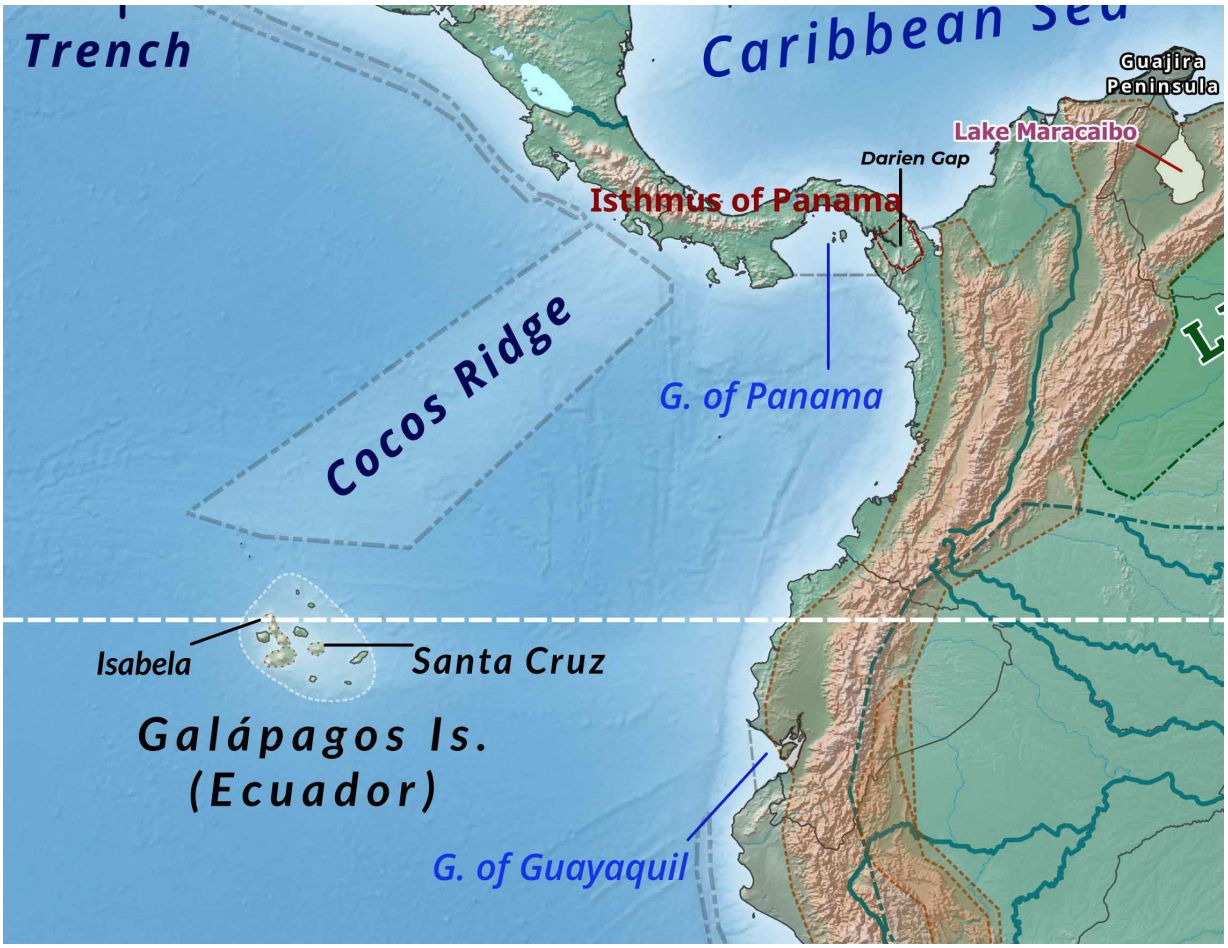
4.4.1. Falkland Islands (UK)

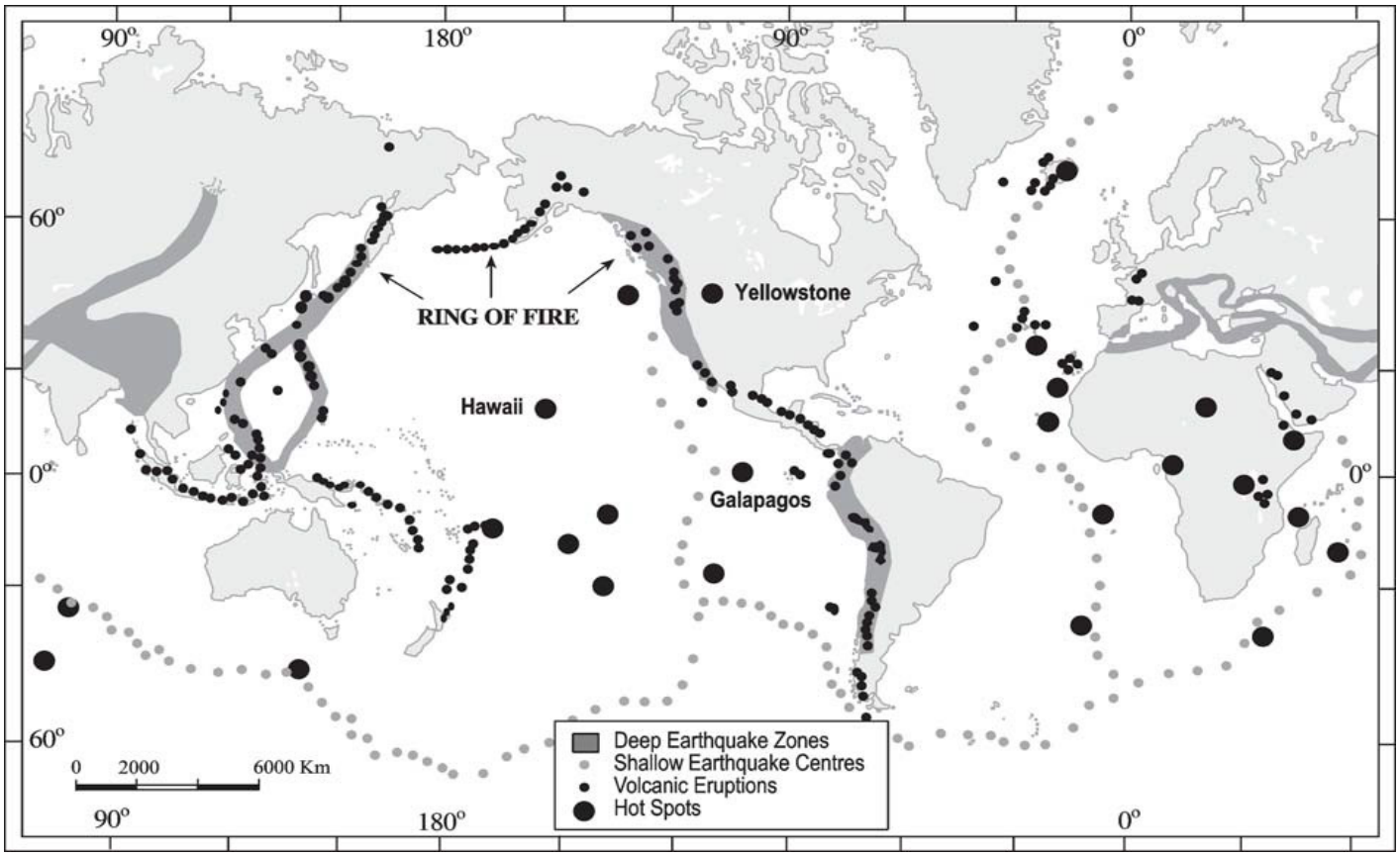
- The Falkland Islands are an archipelago in the South Atlantic Ocean on the **Patagonian Shelf**. As a **British overseas territory**, the UK takes responsibility for their **defence and foreign affairs**. Its sovereignty status is part of an ongoing dispute between **Argentina** and the **United Kingdom**.
- The Falkland Islands comprise two main islands, **East Falkland** and **West Falkland**, along with about 200 smaller islands. The capital is **Stanley**, located on East Falkland. It also administers the **British overseas territory** of **South Georgia and the South Sandwich Islands**.

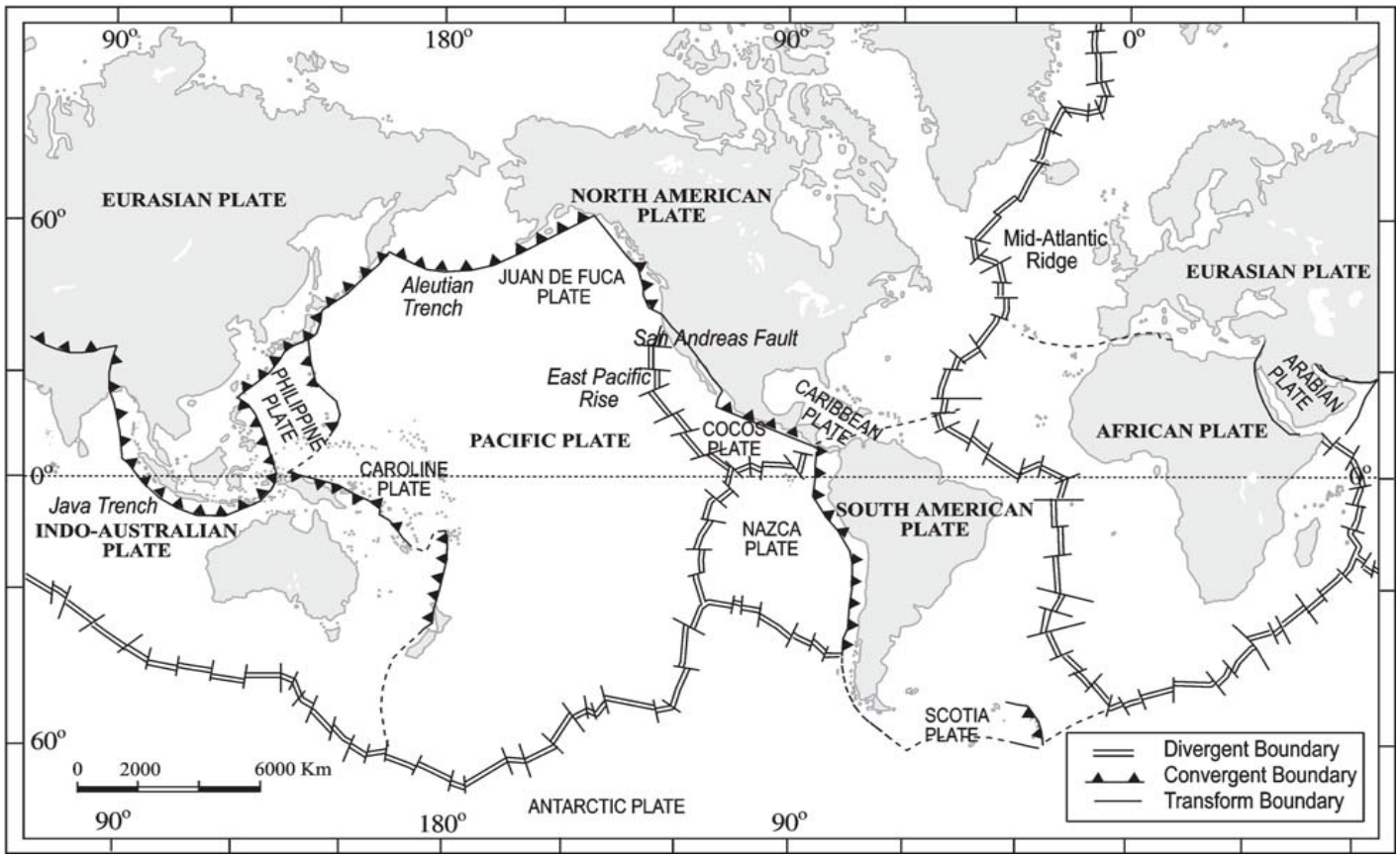
- Major economic activities are **fishing and sheep farming** (emphasising high-quality wool exports).



4.4.2. Galapagos Islands



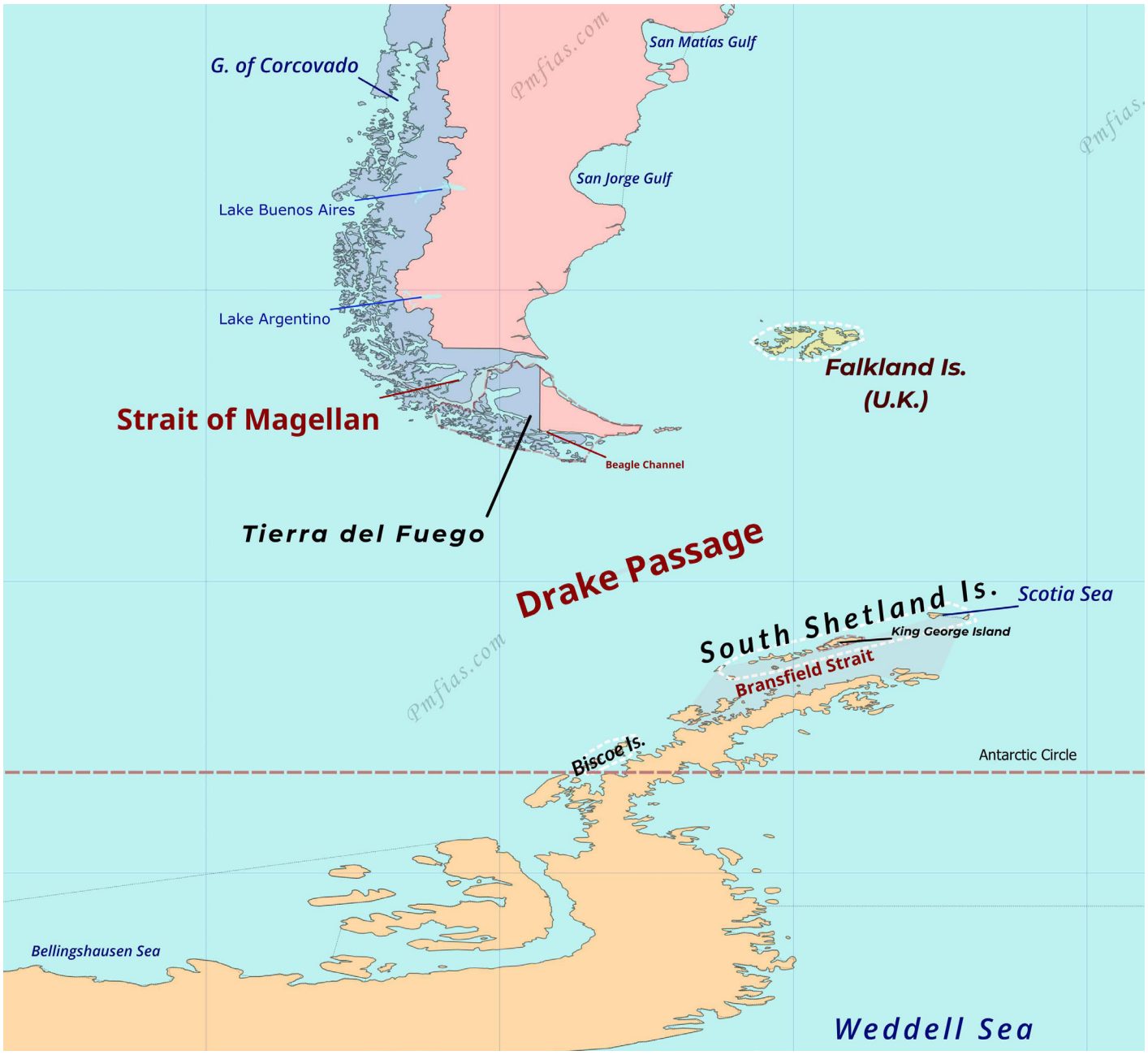




- The Galápagos Islands, a **part of Ecuador**, are **distributed on either side of the equator** in the **Pacific Ocean** about 1,000 km from South America and comprise 19 islands and a surrounding marine reserve, often described as a '**living museum of evolution**.'

- The archipelago is positioned at the confluence of three ocean currents (the South and North Equatorial Currents and the Humboldt Current). It hosts diverse marine species, such as the land iguana, **giant tortoise**, and **finches**.
- Situated on the **Nazca tectonic plate**, the islands have formed as the plate moves eastward over a **hot spot**, resulting in volcanic activity that created the island chain.
- **Geologically young**, the islands are about 5 million years old, with some western islands still forming today. **Mount Azul** (1,689 m) is the highest point, and **Isabela** is the largest Island.

4.4.3. Tierra del Fuego

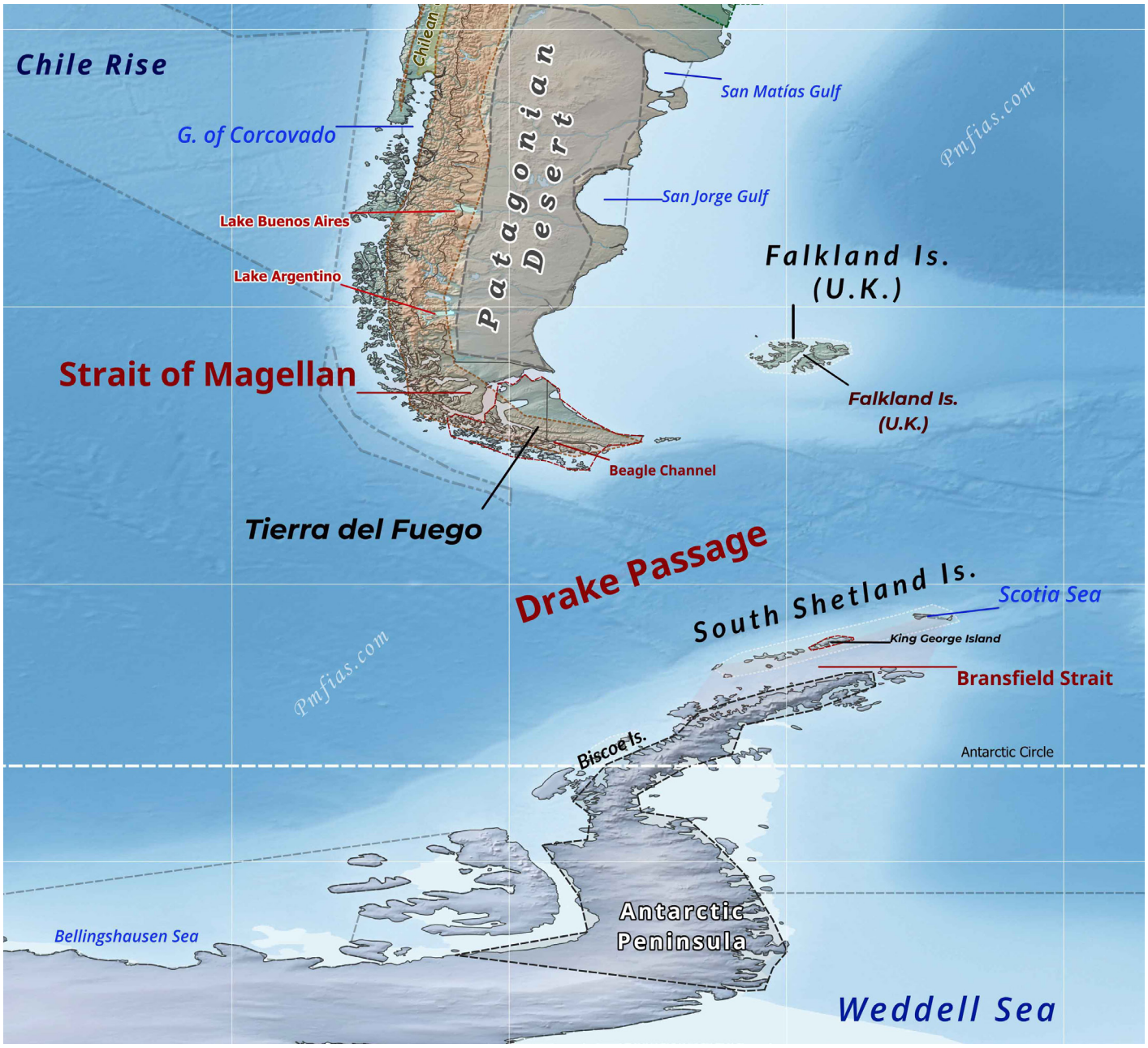


- **Tierra del Fuego** is an archipelago off the **southernmost tip** of the South American mainland. The main island, shaped like a triangle with its **base on the Beagle Channel**, is separated from the mainland by the **Strait of Magellan**.

- The archipelago consists of the main island, **Isla Grande de Tierra del Fuego**, and many other islands.
- Tierra del Fuego is divided between **Chile** and **Argentina**, with the latter controlling the eastern half of the main island and the former the western half plus the islands south of **Beagle Channel**.
- **Patagonian sheep farming and petroleum extraction dominate economic activity in the region**.

Strait of Magellan

- The **Strait of Magellan** is a **navigable sea route in southern Chile**, separating mainland South America to the north and **Tierra del Fuego** to the south.
- The strait is **more sheltered** than the **Drake Passage (stormy open sea route around Cape Horn)**.
- **Punta Arenas**, located on the Brunswick Peninsula, is the principal port along the Strait of Magellan.



4.4.4. South Georgia and the South Sandwich Islands (UK)

- South Georgia and the South Sandwich Islands are a **British Overseas Territory**. Both islands are located in the South Atlantic Ocean. **King Edward Point** is the capital and the largest settlement.
- **Argentina** continues to claim sovereignty over South Georgia and the South Sandwich Islands. The Argentine claim over South Georgia contributed to the **1982 Falklands War**.

4.5. Major Agricultural Regions

4.5.1. Los Llanos or Llanos

- **Los Llanos** is a **vast tropical grassland plain** situated east of the Andes in **Colombia** and **Venezuela**. It is an ecoregion of the **flooded grasslands and savanna biome**.
- The Llanos' main river is the **Orinoco**, which forms part of the **border between Colombia and Venezuela**.
- The elevation of the Llanos rarely exceeds 300 meters, rising gradually from the lower **Llanos Bajos plains** west of the Orinoco River to the **higher Llanos Altos** plateaus beneath the Andes.

4.5.2. Pampas

- The Pampas are **fertile lowlands** covering **parts of Argentina**, **Uruguay** and **Brazil's southern states**.
- The climate is **temperate**, with **precipitation evenly distributed throughout the year**, making the soils **appropriate for agriculture**.
- **Frequent wildfires** ensure that only small plants, such as grasses, flourish, and trees are less common.
- The **Argentine Pampas** are divided into two distinct zones.
  1. The **dry zone** in the west and
  2. The **humid zone** in the east.
- The **dry zone**, encompassing most of **La Pampa province**, is mainly barren and characterised by saline areas, brackish streams, and sandy deserts. The **humid zone**, which includes part of **Buenos Aires province**, is temperate, well-watered, and economically vital, being the country's most populated area.

4.5.3. Gran Chaco (Chaco plain)

- The **Gran Chaco** is a **semiarid lowland** between the **Paraguay River** and the **Andes**. It is a geosyncline formed by subsidence between the Andean cordilleras and the Brazilian Highlands, filled with alluvial debris. It is primarily an **alluvial sedimentary plain** shared among Paraguay, Bolivia, and Argentina.
- The Gran Chaco is traversed by two permanent rivers, the **Pilcomayo** and the **Bermejo (Teuco)**, which flow southeastward from the Andes to the Paraguay River.
- The Chaco is one of South America's last **agricultural** frontiers. Agricultural expansion has made it one of the **most deforested areas on the planet**.

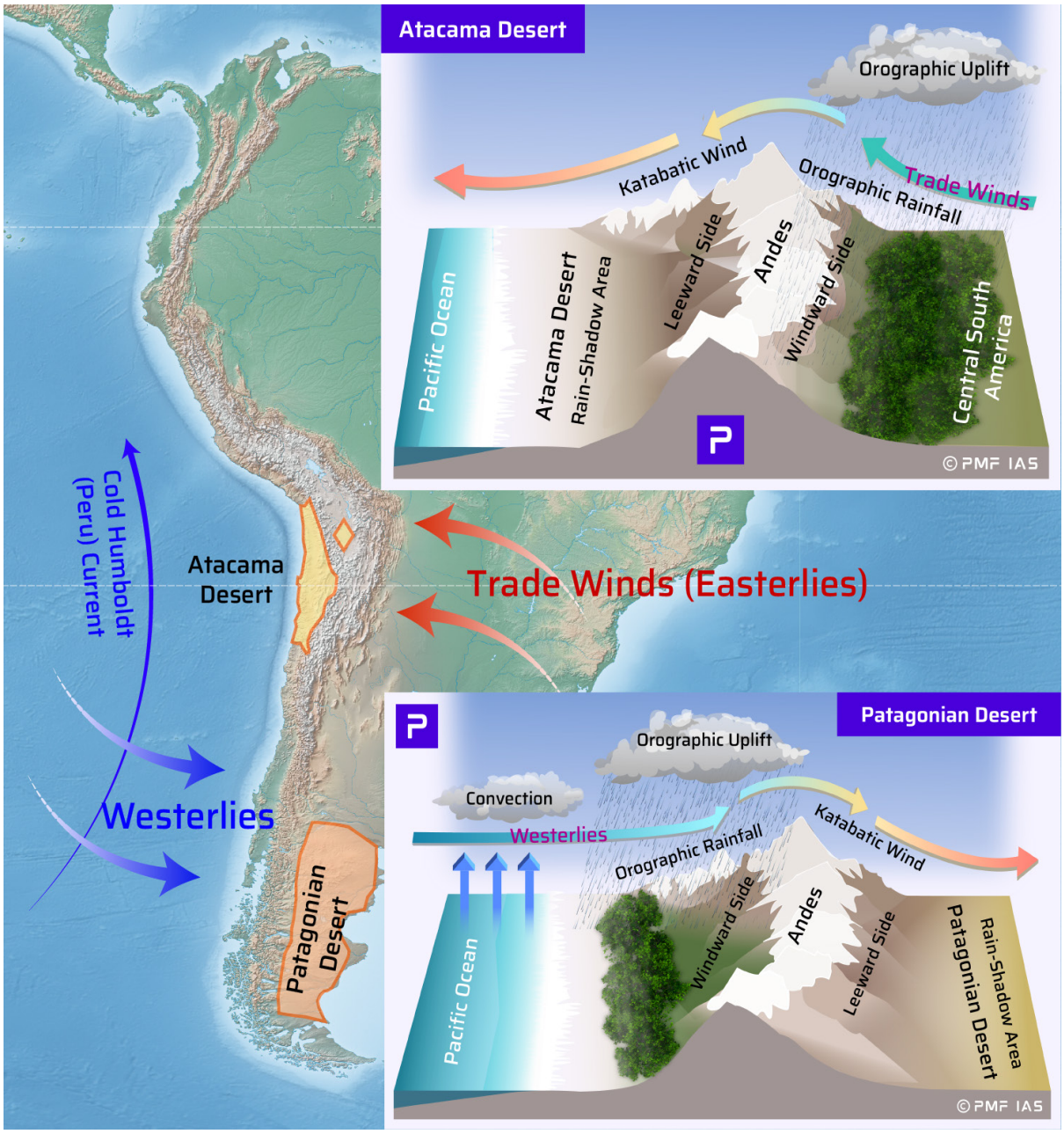
4.5.4. Patagonia

- **Patagonia** is a sparsely populated region in South America's southern end. It is a **semiarid scrub plateau** in Argentina and Chile, characterised by **steppe** and **desert** landscapes. The Andes bound it to the west, the **Colorado River** to the north, the **Atlantic** to the east, and the **Strait of Magellan** to the south.

- The coast of Patagonia is composed of **high cliffs** separated from the sea by a narrow coastal plain. The region has **lakes**, **fjords**, **and glaciers in the west** and **deserts and steppes to the east**.
- In the late 19th and early 20th centuries, **sheep farming** expanded across the **Patagonian grasslands**, making the southern regions of Argentina and Chile some of the **world's foremost sheep farming areas**.

4.6. Major Deserts of South America

4.6.1. Atacama Desert



- The **Atacama**, **or Peruvian Desert**, is **one of the driest places on earth**. It primarily consists of **salt pans at the foot of the coastal mountains** and **alluvial fans** that slope from the Andean foothills.

What makes it so dry?

1. **Rain shadow effect of the Andes**

2. **Off-shore trade winds**
3. **Absence of the westerlies (they blow far to the south of the Tropic of Capricorn)**
4. **Dry subsidence caused by the South Pacific high-pressure cell**
5. **The cold Humboldt current and upwelling of cold water due to the Walker Circulation**

- **The most arid region is between the Andes and the Chilean Coast Range (two-sided rain shadow)**.

4.6.2. Patagonian Desert

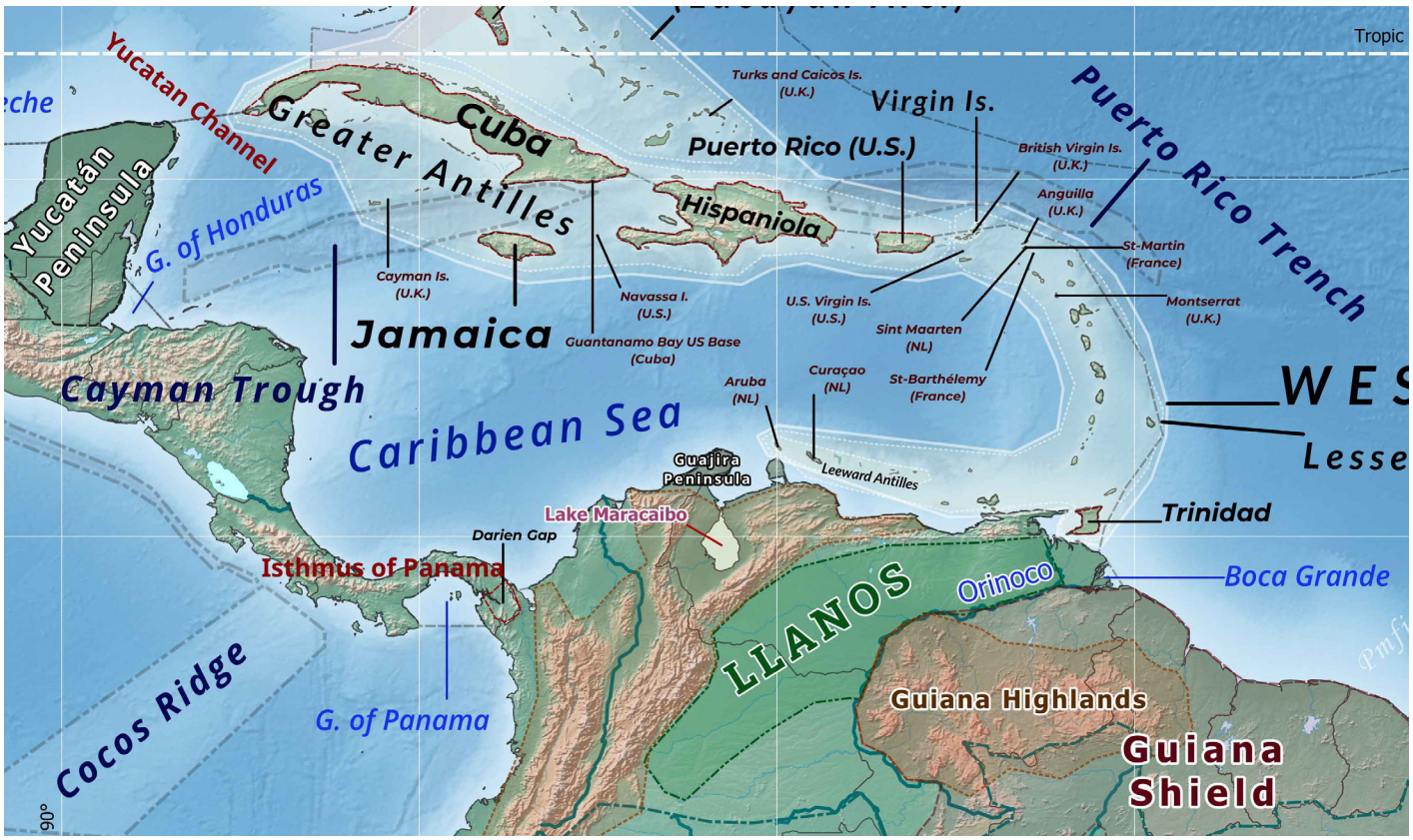
- The **Patagonian Desert (Steppe)** is the **largest desert in Argentina**. It is located primarily in **Patagonia**, southern Argentina and is bounded by the **Andes** to its west and the **Atlantic Ocean** to its east.
- The desert's topography is characterised by alternating tablelands and massifs dissected by river valleys and canyons.
- Shrubby and herbaceous plant species dominate the central parts of the Patagonian Steppe. In the western areas, where precipitation is higher, bushes give way to grasses.

4.7. Major Lakes

4.7.1. Lake Titicaca

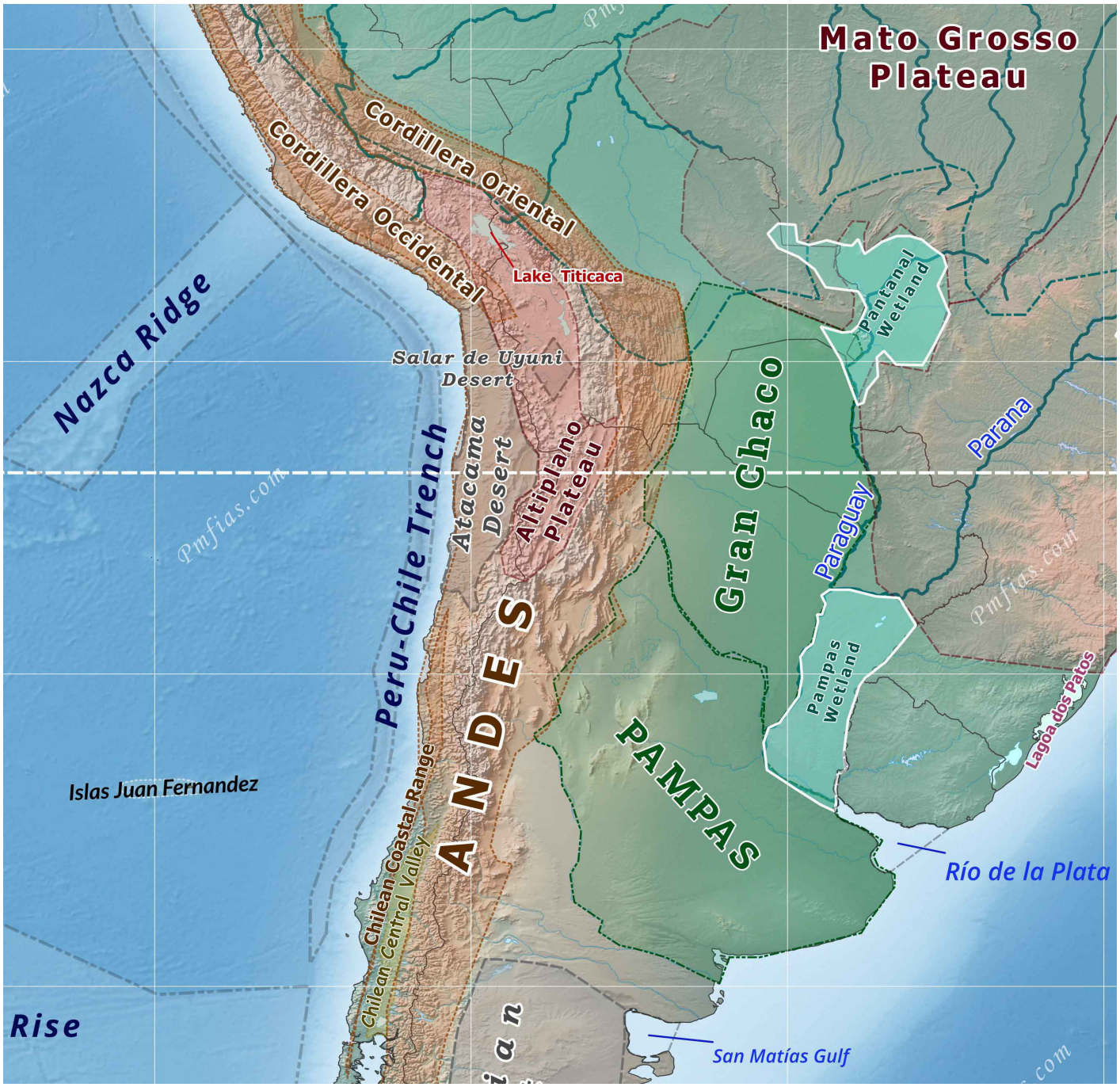
- **Lake Titicaca** is a large, deep **freshwater lake in the Andes** on the border of **Bolivia** and **Peru**.
- It is often called the "**highest navigable lake (3,812 m)**" globally.
- By volume of water and by surface area, it is the **largest lake in South America**.

4.7.2. Lake Maracaibo



- **Lake Maracaibo** is a **brackish tidal bay in Venezuela** and an "**inlet of the Caribbean Sea**".
- Lake Maracaibo has a larger surface area than Lake Titicaca, but it is a **tidal bay**, **not a lake**.
- It is one of the world's richest and most centrally located **petroleum-producing regions**.

4.8. Important Geographical Features



4.8.1. Panama Canal

- The Panama Canal is a **lock-based waterway** that links the Atlantic and Pacific Oceans via the narrow Isthmus of Panama. It saves ships travelling between the U.S. coasts ~15,000 km and reduces voyages between North America and South America by up to 6,500 km.

4.8.2. Altiplano Plateau

- The Altiplano is the **world's second-largest plateau** after Tibet, spanning **southern Peru** and **western Bolivia**, with portions in Chile and Argentina. It is located at an average elevation of 12,000 feet within the Andes Mountains.

- The plateau formed when the Pacific Ocean floor collided with South America, creating parallel **Andean ranges** with a basin between them. During the Pleistocene era, the basin contained numerous pluvial lakes, most of which have disappeared except **Lake Titicaca**. The evaporation of these ancient lakes created massive salt deposits, including the **Salar de Uyuni**.

4.8.3. Salar de Uyuni

- It is the **world's largest salt flat**, located in **Bolivia**. It is almost 100 times larger than **Utah's Bonneville Salt Flats**. The flat's remarkable surface is so level that NASA uses it to **calibrate satellite equipment**.
- During the dry season, from May to October, the sodium chloride crust, which is over 10 meters deep in some areas, **appears cracked**. A thin layer of water covers the surface in the rainy season (November to April), creating a **reflective effect** that merges the sky with the land.
- While traditionally visited only by salt gatherers and adventure tourists, the area is now gaining global attention for housing one of the world's largest **lithium** reserves.

4.8.4. Iguazu Falls

- Iguaçu Falls is a series of **cataracts** located on the **Iguacu River**, near its confluence with the **Alto Parana River**, on the **Argentina-Brazil border**. The falls form an elongated horseshoe shape. The river plunges over an escarpment, creating around 275 separate waterfalls, interspersed with rocky and wooded islands.

4.9. Recently In The News

4.9.1. Nazca Lines

- **AI** has helped to discover hundreds of mysterious **Nazca lines** in **Peru**. These are a group of **geoglyphs** known for depicting larger-than-life animals, plants and imaginary beings. (**Geoglyphs** are **designs** made on the ground using **landscape elements** such as stones, dirt or lumber)
- The geoglyphs, drawn more than two millennia ago on the surface of southern Peru, feature different subjects but mainly plants and animals. **Geometric shapes**, such as triangles, trapezoids and spirals, are also found. Some designs have been associated with astronomical functions as well.
- The Lines were declared a **World Heritage Site** by UNESCO in 1994.

4.9.2. Tapajós River

- It is a navigable river located entirely in **Brazil**. It has hit historic lows amid severe drought, prompting it to declare its first-ever water scarcity emergency for the lower stretch.
- **Source:** Mato Grosso, Brazil.
- **Mouth:** Amazon River, Northern Brazil.

---------- End of Chapter ----------

5. Antarctica

Area	• 5.1 million km^2 (5th largest continent) • Thick ice covers roughly **98 per cent** of its land.
Location	• Situated within the **Antarctic Circle (66°33' S)**. It covers Earth's South Pole.
Sovereign Countries	• **There are no countries in Antarctica**

Territorial Claims	• Seven countries have territorial claims in Antarctica: **Argentina**, **Australia**, **Chile**, **France**, **New Zealand**, **Norway** and **the United Kingdom**.
Antarctic Treaty	• Signed by twelve countries in 1959 and entered into force in **1961**. • Members: 56 **Important Provisions:** ❖ Antarctica shall be used for **peaceful purposes only** ❖ **Freedom of scientific investigation** in Antarctica and cooperation toward that end shall continue ❖ Scientific observations and results from Antarctica shall be exchanged and made freely available
Seasons	• **Two Seasons:** Six months of daylight during summer and six months of darkness during winter.
Climate	• **Temperature:** Average – **minus 34.4°C**; Highest recorded – 15°C • It is **considered a desert**, which receives very little rain or snowfall.
Terrain	• Made up of glaciers, ice shelves and icebergs. • The little snow that falls doesn't melt but accumulates over centuries, eventually forming extensive, thick ice sheets.
Continental Ice Sheets	• It holds around **29 million cubic km of ice**, which is **more than 90% of the world's ice** and **more than 75% of the world's freshwater**.
Flora and Fauna	• **Lichens**, **mosses**, **liverworts** and **algae** survive, and **there are no trees or bushes**. • **Seals** and **Penguins** exist.
Highest Point	• **Vinson Massif (4,897 m)**, Sentinel Range (Western Antarctica)
Glaciers	• **Lambert's Glacier (World's largest glacier)** • Byrd Glacier • Mulock Glacier
Division	• **East Antarctica:** Primarily a high **ice-covered plateau**. • **West Antarctica:** Consists largely of an **ice sheet** covering an archipelago of mountainous islands.

5.1. Important Geographical Features of Antarctica

5.1.1. Antarctic Peninsula

- The Antarctic Peninsula, a region claimed by the United Kingdom, Chile, and Argentina, extends 1,300 km northward from Antarctica towards the southern tip of South America. It is an ice-covered and mountainous peninsula. **Bransfield Strait** separates the peninsula from the **South Shetland Islands** (a part of the British Antarctic Territory) to the north.

5.1.2. Ross Sea

- The Ross Sea is a **southern extension of the Southern Ocean**. The expansive **Ross Ice Shelf** (which marks its southern limit) at its head creates a deep indentation in Antarctica's circular continental outline.
- It stretches between **Cape Adare** in northern Victoria Land on the west and **Cape Colbeck** on the Edward VII Peninsula on the east. The northern boundary lies near the edge of the continental shelf.

Ross Island

- Ross Island is a **volcanic formation** situated in the western Ross Sea near the northern edge of the Ross Ice Shelf and just off the coast of Victoria Land. It features **Mount Erebus (3,800 meters)**, the **southern-most active volcano on earth**, **Mount Terror** and a series of mountain ranges.

Ross Ice Shelf

- The Ross Ice Shelf is the **world's largest floating ice body**, located at the head of the Ross Sea. It is **primarily fed by massive glaciers**, **or ice streams**, that transport ice from East and West Antarctica's high polar ice sheet.

> ⇨ **Ice sheets** are vast, grounded masses of glacial ice found in Antarctica and Greenland, while **ice shelves** are their floating extensions over the ocean.
> ⇨ **Icebergs** are large blocks of ice that break off from ice shelves or glaciers, and **sea ice** is frozen seawater that forms seasonally in polar regions.

5.1.3. Weddell Sea

- The Weddell Sea is located in the Southern Ocean, south of the Atlantic Ocean and east of the Antarctic Peninsula. Much of the **world's cold oceanic bottom waters** originate from the depths of the **Weddell Sea**. **Seymour Island** is located in the Weddell Sea and near the Antarctic Peninsula.

Ronne Ice Shelf and Filchner Ice Shelf

- The Ronne Ice Shelf is a **vast body of floating ice** situated at the head of the Weddell Sea, an indentation along Antarctica's Atlantic coastline. It lies immediately west of the **Filchner Ice Shelf**, which is located at the head of the Weddell Sea. Berkner Island partially separates the two ice shelves, often collectively called the **Filchner-Ronne Ice Shelf**.

Larsen Ice Shelf

- The **Larsen Ice Shelf** is situated in the Weddell Sea, off the eastern coast of the Antarctic Peninsula. It comprises three main sections: **Larsen A**, **Larsen B**, and **Larsen C**. Each has experienced significant disintegration in recent decades.
- Larsen A collapsed in 1995, losing about 3,250 km^2 of ice, while Larsen B dramatically collapsed in 2002, losing a similar area in just over a month. Larsen C, the largest remaining section, saw a massive iceberg break off in July 2017, reducing its area by approximately 12%.

5.1.4. Transantarctic Mountains

- The Transantarctic Mountains (3,200 km) form a major mountain system dividing the Antarctic continent into East and West Antarctica. **Mount Kirkpatrick (4,528 m)** is the highest Peak.
- The United States, the United Kingdom, and New Zealand have established research stations at the base of these mountains.

5.1.5. Antarctic Convergence

- The Antarctic Convergence, known as the **Antarctic Polar Front**, is the **Southern Ocean's natural boundary or transition zone**, where cold Antarctic waters meet and sink beneath the relatively warmer sub-Antarctic waters.
- The Antarctic Convergence is a **dynamic feature** of the Southern Ocean, influencing the distribution of marine life, nutrient cycling, and global ocean circulation patterns.

5.1.6. Drake Passage

- The **Drake Passage** lies between **Cape Horn**, the southernmost point of South America, and the **South Shetland Islands** off the Antarctic Peninsula. It separates South America and Antarctica. It connects the Atlantic and Pacific Oceans through a narrow passage.
- **Strong currents and turbulent waters** characterise it due to the **Antarctic Circumpolar Current (ACC)**, which flows continuously eastward around Antarctica, driven by **strong westerly winds**.

5.2. Important Landforms

5.2.1. Lake Vostok

- It is Antarctica's largest **subglacial lake**, lying approximately 4 km beneath **Russia's Vostok Station** on the **East Antarctic Ice Sheet**. Its existence was confirmed in the mid-1990s through seismic and ice-penetrating radar surveys.

> ⇨ A **subglacial lake** is a **large body of liquid water beneath an ice mass**. These lakes typically form where a glacier or ice sheet overlays and comes into contact with the underlying bedrock.

5.2.2. Gamburtsev Mountains

- The Gamburtsev Mountains are a completely **subglacial mountain range** in eastern Antarctica. They are a part of an **ancient rift system** spanning about 3,000 km and buried under 600+ meters of ice. They were formed ~250 million years ago during Gondwana's breakup.

5.2.3. McMurdo Dry Valleys

- The McMurdo Dry Valleys, located on the western coast of **McMurdo Sound**, are Antarctica's largest **ice-free region**, spanning ~4,800 square km. It is known for its **Mars-like conditions** and features frozen lakes and exposed soil with minimal life-supporting conditions due to extreme cold, scarce precipitation, and salt accumulation.
- Strong **katabatic winds (downslope winds)** prevent snow accumulation through sublimation, leaving only alpine glaciers and lake ice in the area.

> ⇨ **McMurdo Sound** is a frozen, wind-swept body of water bordered north by the Ross Sea and south by the McMurdo Ice Shelf.

5.2.4. Blood Falls

- Blood Falls, named for its striking red hue, is not actual blood but iron-rich, salty water flowing from fissures in **Antarctica's Taylor Glacier**. Initially thought to be due to red algae, its true origin was revealed by radar imaging, showing a network of subglacial rivers and a briny lake beneath the glacier.
- The high iron content gives the water its **red tint**. At the same time, the brine's elevated salt levels lower its freezing point and release heat as it freezes, allowing the liquid to flow despite the glacier's frigid temperatures.

5.3. Important Terms

- **Diamond dust:** Tiny ice crystals that float in the air, creating optical phenomena.
- **Sun dogs and halos:** Common atmospheric optical phenomena due to ice crystals.
- **Ice piedmonts:** Glaciers that spread out over coastal lowlands.
- **Ice tongues:** Long extensions of glaciers floating on the ocean.
- **Polynyas:** Areas of open water surrounded by sea ice, crucial for wildlife.

5.4. Research Stations in Antarctica

- Antarctica hosts over **70 research stations** run by more than **40 countries** worldwide. Research stations are strategically located in different regions of Antarctica to facilitate specific research goals. Most research stations **operate on a seasonal basis** (summer months – October to February).
- Some major research stations include McMurdo Station (United States), Concordia Station (France and Italy), Neumayer Station III (Germany), Vostok Station (Russia), and Amundsen-Scott South Pole Station (United States).

5.5. India Antarctica Program

- India's Antarctic expedition began in 1981, reaching Antarctica on January 8, 1982.
- After operating from a ship and temporary shelters for two years, India established its first permanent research station, "**Dakshin Gangotri**," in 1983 on the ice shelf in **Central Dronning Maud Land**. The station was **abandoned in 1990** because it was buried under snow.
- The **Maitri research base** has been operational in the central part of **Schirmacher Oasis**, **Central Dronning Maud Land**, East Antarctica, since 1988.
- About 3000 km east of Maitri, the Indian research base **'Bharati'** (since 2012) is located between Thala Fjord and Quilty Bay, east of Stornes Peninsula. **Maitri and Bharati are fully operational**.
- The **National Centre for Polar and Ocean Research (NCPOR)**, Goa — an autonomous institute under the Ministry of Earth Sciences — manages the entire Indian Antarctic program.

5.6. The Indian Antarctic Act 2022

- The Act aims to provide national measures for **protecting the Antarctic environment** and dependent and associated ecosystems and to give effect to the **Antarctic Treaty**, the **Convention on the Conservation of Antarctic Marine Living Resources**, and the **Protocol on Environmental Protection to the Antarctic Treaty**.
- The **Committee on Antarctic Governance and Environmental Protection (CAG-EP)**, established by the Central Government under the Act, has the following functions:
  - ❖ Monitor, implement, and ensure compliance with international laws, emission standards, and rules for protecting the Antarctic environment by operators and others engaged in Antarctic activities.
  - ❖ Undertake advisory, supervisory, or enforcement activities related to Antarctic programmes and activities.
  - ❖ Obtain and review relevant information and reports from parties to the Treaty, the Convention, the Protocol, and other parties involved in Antarctic programmes and activities.

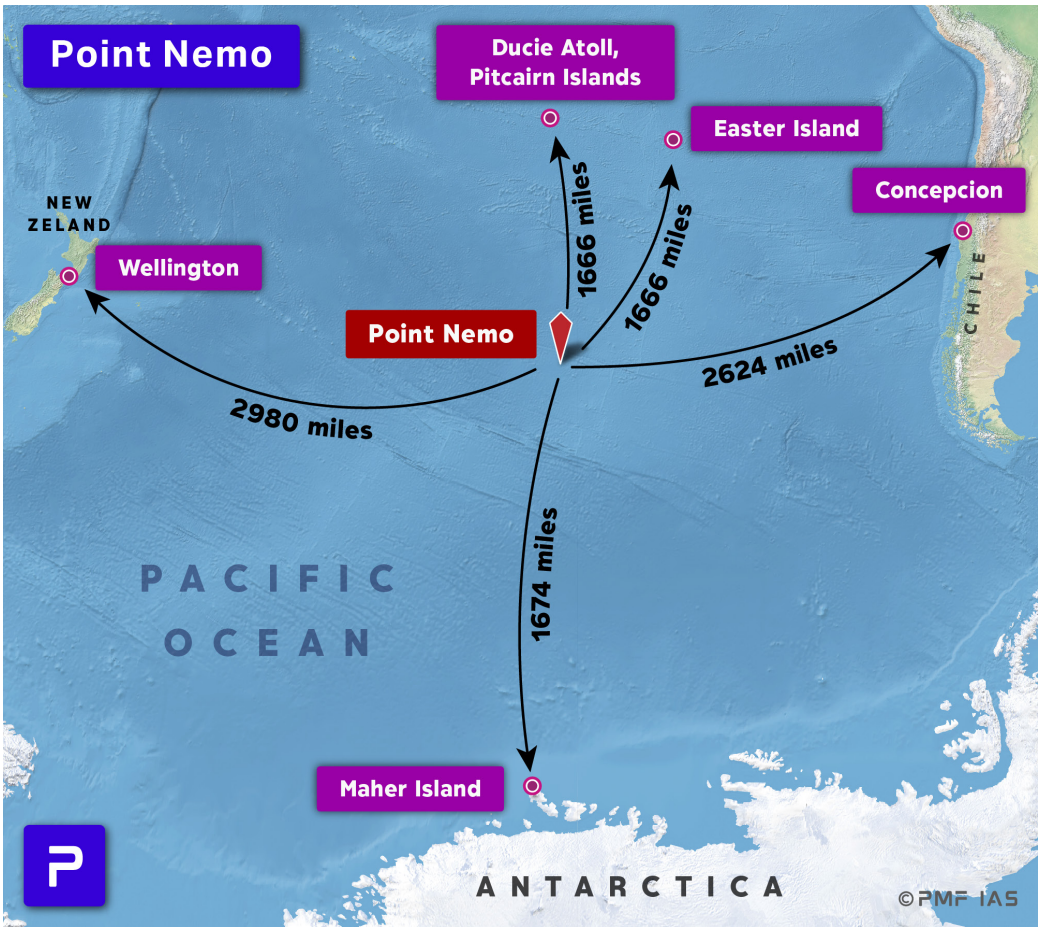
[UPSC 1995] Which one of the following is the continent with the highest mean elevation in the world?

a) Antarctica
b) North America
c) Asia
d) South America

Answer: a) Antarctica

5.7. Recently In The News

5.7.1. Point Nemo



- Chris Brown, a British explorer, became the first person to lead an expedition to **Point Nemo**, also known as the "**oceanic pole of inaccessibility**", which is considered the **remotest place on Earth**.
- The nearest land is the **Pitcairn Islands**, 2,688 km away. The closest humans are the astronauts on the International Space Station, 408 kilometers away in low Earth orbit.
- While many sailors have navigated near Point Nemo, no specific expedition has reached the exact location since its discovery in 1992.

---------- End of Chapter ----------

6. Europe

- Europe, like North America, is **located entirely in the Northern Hemisphere**. It is commonly considered to be separated from Asia by the watershed of the **Ural Mountains**, the **Ural River**, the **Caspian Sea**, the **Greater Caucasus**, the **Black Sea**, and the waterways of the **Turkish Straits**.

Area	• 10.2 million km^2 (2% of the Earth's surface – **2nd smallest continent**)
Coastline	• 38,000 km
Sovereign Countries	• 51 sovereign states • **<u>Largest European countries:</u> Russia**, **Ukraine**, **France**, Spain, Sweden and Norway. • **<u>Smallest Countries in Europe:</u>** 1. **Vatican City** (an enclave in Rome – 0.44 km^2), 2. **Monaco** (bordered by France and the Mediterranean Sea – 2 km^2),

	3. **San Marino** (enclave in Italy), 4. **Liechtenstein** (located between Switzerland and Austria), 5. **Malta** (an island in the Mediterranean near Sicily), 6. **Andorra** (located in the eastern **Pyrenees**, bordered by France to the north and Spain to the south), etc.
Major Islands/Island groups	• Novaya Zemlya (Russia), • Franz Josef Land (Russia), • **Svalbard** (Norway), • **Iceland**, • **The Faroe Islands** (Denmark), • Zealand (Denmark), • The Channel Islands (British Crown Dependency), • The Shetland (U.K.), • The British Isles (Ireland, Great Britain and the Isle of Man), • The Balearic Islands (Spain), • Corsica (France), • **Sardinia** (Italy), • **Sicily** (Italy), • Aeolian Islands (Italy), • **Malta** (sovereign nation in the Mediterranean) • Crete (Greece)
Largest Lakes	1. **Lake Ladoga** (Russia) 2. **Lake Onega** (Russia) 3. Kuybyshev Reservoir (Russia) 4. **Lake Vänern** (Sweden) 5. Rybinsk Reservoir (Russia)
Highest Mountains	1. **Mount Elbrus** (5642 m) 2. Mont Blanc (4808 m)
Facts	• **Northernmost point:** Cape Nordkinn, Norway (mainland). • **Southernmost point:** Island of Gavdos, Greece. • The **Pyrenees** (mountain range) form a natural border between France and Spain. • **Vatnajokull glacier** in Iceland is the largest glacier in Europe. • **Peninsula of Peninsulas:** Europe's indented coastline creates numerous peninsulas. • **Europe has 14 landlocked countries:** Andorra, Austria, Belarus, the Czech Republic, Hungary, **Liechtenstein** (double-landlocked), Luxembourg, North Macedonia, Moldova, San Marino, Serbia, Slovakia, Switzerland, and Vatican City.

	• **<u>Vatican City:</u>** The World's smallest country. **St**. **Peter's Basilica** in Vatican City is the largest church in the world. • **Finland** is called the **Land of a Thousand Lakes**.

[UPSC 2023] Consider the following countries:

1. Bulgaria
2. Czech Republic
3. Hungary
4. Latvia
5. Lithuania
6. Romania

How many of the above-mentioned countries share a land border with Ukraine?

a) Only two
b) Only three
c) Only four
d) Only five

Explanation

Answer: a) Only two

[UPSC 2008] Which of the following countries share borders with Moldova

1. Ukraine
2. Romania
3. Belarus

Select the correct answer using the code given below:

a) 1 and 2 only
b) 2 and 3 only
c) 1 and 3 only
d) 1, 2 and 3

Answer: a) 1 and 2 only

[UPSC 2007] Through which one of the following Straits does a tunnel connect the United Kingdom and France?

a) Davis Strait
b) Denmark Strait
c) Strait of Dover
d) Strait of Gibraltar

Answer: c) Strait of Dover

[UPSC 2005] Consider the following statements:

1. Great Britain comprises England, Wales, Scotland and Northern Ireland.
2. England covers less than 60% of the total area of the United Kingdom.

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Explanation

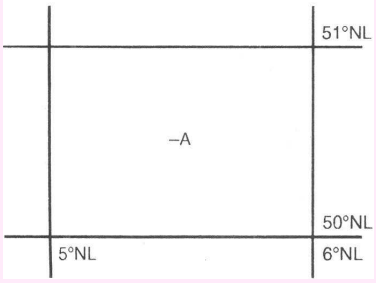
- Great Britain is the name of the island that comprises England, Wales, and Scotland.

Answer: b) 2 only

Consider the geographical details given in the following figure:

The point marked by A in the above figure indicates the countries in :

a) North America
b) South America
c) Europe
d) Asia



Answer: c) Europe

6.1. Major Geographic Features of Europe

6.1.1. Major Mountain Ranges of Europe

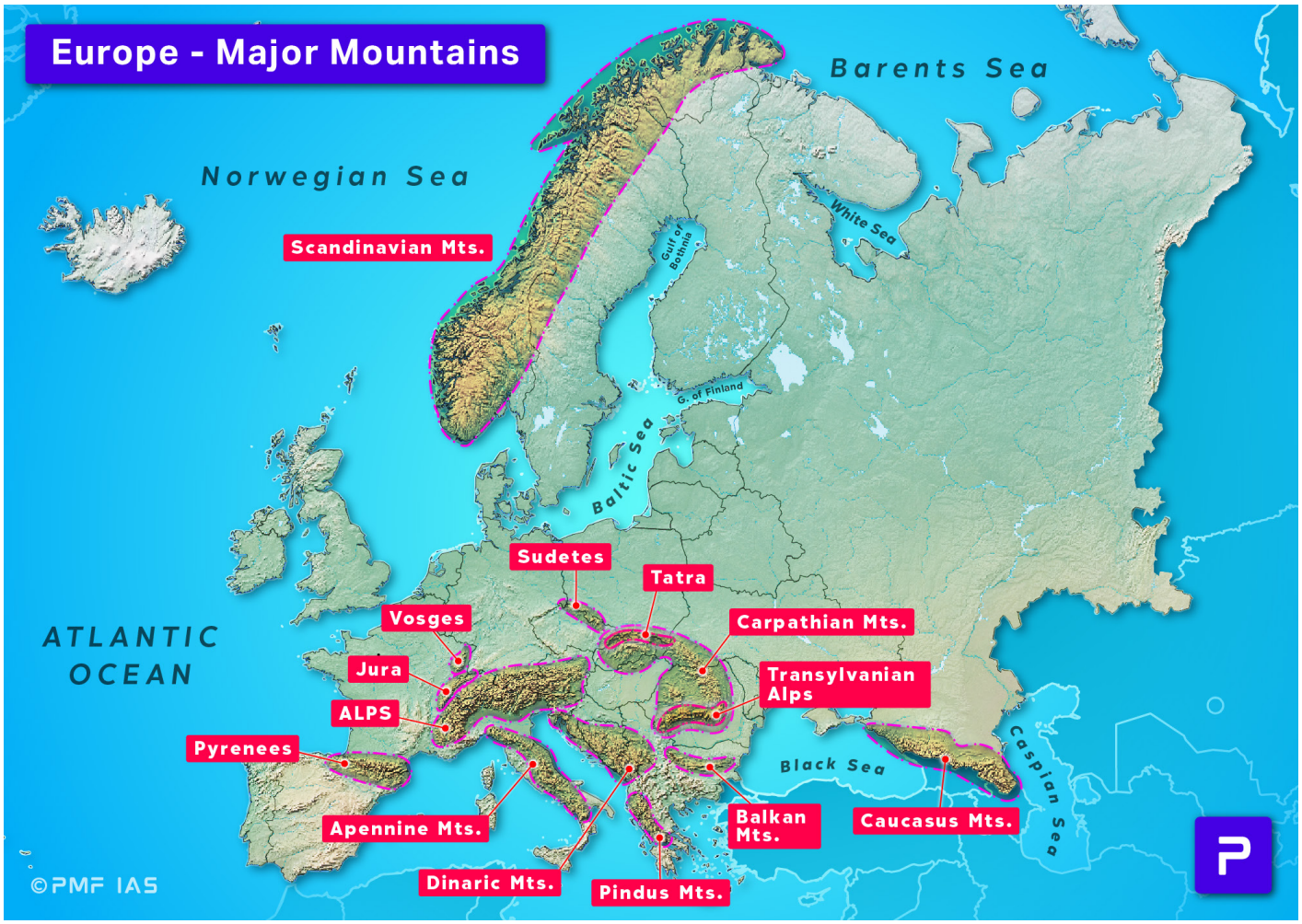
Ural Mountains (~2,500 km)

- It is **one of the oldest** mountains on Earth, formed between 250 and 300 million years ago due to continental collision. It forms part of the **natural boundary** between the continents of Europe and Asia.
- It traverses Arctic tundra in the north and forested and semi-desert landscapes in the south. The **Mughalzhar Hills**, part of the Uralian orogenic belt, extend into northwestern Kazakhstan, dividing the **Caspian** and **Aral** basins.
- **Highest Peak:** **Mount Narodnaya** (1,895 m) in Russia.
- The Ural rivers drain into either the **Arctic Ocean** or the **Caspian Sea**.

Scandinavian Mountains (1,762 km)

- They run through the **Scandinavian Peninsula**. The western sides of the mountains drop into the **North Sea** and the **Norwegian Sea**, forming the **fjords (long, narrow inlets with steep sides)** of Norway. In the north, they form the **border** between **Norway** and **Sweden**.

Greenland Sea
Svalbard
Barents Sea
Norwegian Sea
Arctic Circle
Vestfjorden
Trondheimsfjorden
Sognefjorden
Boknafjorden
Faroe Is. (Denmark)
Shetland Is.
Orkney Is.
Outer Hebrides
North Channel
Great Britain
Inner Seas
Irish Sea
Ireland
United Kingdom
Bristol Channel
English Channel
Dover strait
Jersey (U.K.)
Guernsey (U.K.)
North Sea
Frisian Is. (Wadden Sea Is.)
Wadden Sea
Netherlands
Belgium
Norway
Oslo
Sweden
Stockholm
Vänern
Vättern
Skagerrak
Kattegat
Denmark
Zealand (DK)
Kobenhavn
Copenhagen
Gotland (Sweden)
Saaremaa (Estonia)
Åland (Finland)
G. of Bothnia
Finland
Helsinki
G. of Finland
Tallinn
Estonia
G. of Riga
Riga
Latvia
Lithuania
Vilnius
Kaliningrad
Baltic Sea
Stettiner Haff
Poland
Warsaw
Germany
Berlin
Hamburg
Cologne
Bonn
Frankfurt
Stuttgart
Munich
Rhine
Danube
Prague
Czechia
Katowice
Slovakia
Bratislava
Vienna
Austria
Budapest
Hungary
Zagreb
Croatia
Slovenia
Ljubljana
Sarajevo
Bosnia and Herz.
Belgrade
Serbia
Sofia
Bulgaria
Romania
Bucharest
Moldova
Chisinau
Kiev
Ukraine
Minsk
Belarus
Murmansk
Arkangel'sk
White Sea
Lake Onega
Lake Ladoga
Neva
Saint Petersburg
Rybinsk Reservoir
Volga
Moscow
Volgograd Reservoir
Volgograd
Don
Dnieper
S. of Azov
Kerch Strait
Black Sea
Mt. Elbrus (5642)
Mt. Shkhara (5200)
Georgia
Tbilisi
Armenia
Yerevan
Azerb
Lake Van
Turkey
Istanbul
Bosporus
Ankara
S. of Marmara
Dardanelles
Aegean Sea
Greece
Athens
Mt. Olympus (2917)
Macedonia
Albania
Strait of Otranto
Ionian Sea
Ionian Is.
Cyclades
Sea of Crete
Crete
Rhodes
Cyprus
N. Cyprus
Nicosia
Akrotiri (U.K.)
Dhekelia (U.K.)
Levantine Sea
Aleppo
Lake Assad
Syria
Damascus
Beirut
Nazareth
Haifa
Sea of Galilee
Mosul
Irbil
Kirkuk
Tikrit
Baghdad
Euphrates
Iraq
Adriatic Sea
Tyrrhenian Sea
Italy
Rome
Vatican
Naples
Mt. Vesuvius (1281)
Mt. Stromboli (1281)
Aeolian (Lipari) Is.
Messina Strait
Sicily (IT)
Mt. Etna (3322)
Strait of Sicily
Valletta
Malta
G. of Gabès
Tunisia
Tunis
Algiers
Constantine
Sardinia (IT)
Corsica (Fr)
Florence
Pisa
Milan
Venice
San Marino
Vatican City
Monaco
Andorra
Liguria Sea
G. of Lion
Marseille
Mont Blanc (4807)
Matterhorn (4478)
Switzerland
Geneva
Zurich
Basel
Bern
Lyon
Paris
France
Bordeaux
Bay of Biscay
Spain
Madrid
Portugal
Lisbon
Barcelona
Valencia
Balearic Sea
Balearic Is.
Gibraltar (U.K.)
Strait of Gibraltar
Alboran Sea
Oran
Casablanca
Rabat
40°
50°
60°
70°



- **<u>Highest Peak:</u> Galdhøpiggen** (2,469 m) in southern Norway.
- The mountain range is closely linked with the **Scandinavian Montane Birch Forest**.

Carpathian Mountains (~1,500 km)

- It is the third-longest mountain system in Europe, and the **highest in Ukraine**. The highest range within the Carpathians is known as the **Tatra Mountains** in Slovakia and Poland. Most water runoff from the Carpathians **flows into the Black Sea**, with major rivers including the **Vistula**, **Dniester**, etc.
- **<u>Highest Point:</u>** Gerlachovský štít (2,541 metres) in Slovakia.
- **<u>Western Carpathians:</u>** Austria, Czech Republic, Poland, Slovakia and Hungary
- **<u>Eastern Carpathians:</u>** South-eastern Poland, eastern Slovakia, Ukraine, and Romania
- **<u>Southern Carpathians:</u>** Romania and eastern Serbia

Alps (~1,200 km)

- The Alps are the highest mountain range system that lies entirely in Europe. They stretch across **eight Alpine countries** (from west to east): France, Switzerland, Monaco, Italy, Liechtenstein, Austria, Germany, and Slovenia.
- The Alpine region contains about a hundred peaks higher than 4,000 metres (**four thousanders**). **Mont Blanc** (French–Italian border) is the highest mountain in the Alps, at 4,808 m.

- Major European rivers flow from the Alps, including **the Rhine**, **the Rhône**, the Inn, and the **Po**.

Foehn

- **Foehn** is a **hot wind** that develops on the **leeward side of the Alps**. It helps animal grazing by melting snow and aids the ripening of grapes.

Mistral

- Mistral blows from the Alps **over France towards the Mediterranean** through the **Rhone valley**. It is **very cold and dry** at high speeds, bringing **blizzards** into southern France.

Caucasus Mountains (~1,100 km)

- The Caucasus is a mountain system and region between the **Black Sea to the west** and the **Caspian Sea to the east**. It consists of two main mountain ranges: the **Greater Caucasus** to the north and the **Lesser Caucasus** to the south.
- The Greater Caucasus range is a **natural barrier between Europe and Asia**. It is shared mainly by **Russia (Europe)**, **Georgia (Asia)**, and the northernmost parts of **Azerbaijan**. Europe's highest mountain, **Mount Elbrus**, at 5,642 m, is in the **Greater Caucasus**.
- The **Lesser Caucasus is part of Asia**. **Armenia**, **Azerbaijan**, and **Georgia** occupy it, but it also extends to parts of **north-eastern Turkey** and **northern Iran**.

Caledonian Orogeny

- Around 520 million years ago, Earth's continents were divided into **Gondwana** and **Laurentia**, separated by the **Iapetus Ocean**. The UK was split between these continents, with northern Scotland on Laurentia and the rest on Gondwana. The Caledonian Orogeny was the tectonic process that united these land masses. The orogeny created mountain ranges with an NE-SW trend, remnants of which are visible in the **Scottish Highlands**, Lake District, and North Wales.

[UPSC 2024] Consider the following information:

	Region	***Name of the mountain range***	***Type of mountain***
1.	Central Asia	Vosges	Fold mountain
2.	Europe	Alps	Block mountain
3.	North America	Appalachians	Fold mountain
4.	South America	Andes	Fold mountain

In how many of the above rows is the given information correctly matched?

a) Only one
b) Only two
c) Only three
d) All four

Explanation

- Vosges ➔ France ➔ Block Mountain.
- Alps ➔ Europe ➔ Fold Mountain.
- Appalachians ➔ North America ➔ Fold Mountain.
- Andes ➔ South America ➔ Fold Mountain.

Answer: (b) Only two

6.1.2. Major Rivers of Europe

River	Origin	Mouth	Features
1. **Volga (3,690 km)**	Valdai Hills, **Russia**	**Caspian Sea**	• It is the **longest river in Europe**. • It is economically the most important river. • **The Oka** and **Kama Rivers** are important tributaries.
2. **Danube (2,860 km)**	**Black Forest**, **Germany**	Danube Delta, **Black Sea**	• The river **runs through the second largest number of countries (ten)** in the world (after the **Nile**, **which runs through eleven countries**).

			• It is the **second-largest river in Europe**. • It is an **international waterway** that crosses Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova, and Ukraine. • It is connected to the **North Sea** via the **Rhine-Main-Danube Canal**. • **Major Cities:** **Vienna**, Bratislava, **Budapest**, and Belgrade.
3. **Ural (2,428 km)**	Ural Mountains, Russia.	**Caspian Sea**, Kazakhstan	• It passes through Russia and Kazakhstan.
4. **Dnieper (2,290 km)**	**Valdai Hills**, Russia	Dneiper Delta, **Black Sea**, **Ukraine**.	• It flows through **Russia**, **Belarus** and **Ukraine**. • It is the **longest river in Ukraine and Belarus**. • The Dnieper is an **important navigable waterway** for the economy of Ukraine.
5. **Don (1,950 km)**	Central Russian Upland	**Sea of Azov**, Russia.	• It is the second major river of Western Russia. • It is an **important inland waterway** and is navigable for most of its course.
6. **Rhine (1,236 km)**	**Switzerland**	**North Sea**, Netherlands	• It is the most **critical waterway** in Europe, **running through many critical industrial centres**. • It flows through **Switzerland**, **Germany**, **France**, and the **Netherlands**.
7. **Vistula (1047 km)**	Southern Poland	Gdańsk Bay, **Baltic Sea**, northern Poland	• Poland's largest river.
8. **Loire (1,012 km)**	Massif Central, **France**	**Bay of Biscay**, Western France.	• The longest river in France.
9. **Oder (854 km)**	Olešnice town, **Czech Republic**	Szczecin Lagoon, **Baltic Sea**	• For a small distance, it constitutes the boundary between Poland and Germany. • It is an **important waterway** and flows through the Czech Republic, Poland, and Germany.
10. **Rhone (815 km)**	Rhône Glacier, Swiss Alps	**Mediterranean Sea**	• It is one of the major rivers **flowing directly to the Mediterranean Sea**.

11. **Seine**	Langres Plateau, **France**	**English Channel**, Northern France	• Important waterway within the **Paris basin**. • France's second-longest river after the **Loire**. • **Geology:** The river basin comprises permeable rocks, which help reduce flood risk.
12. **Elbe**	On the **border between the Czech Republic and Poland**	**North Sea**, Germany	• It flows through the **Czech Republic** and **Germany** and has been an important transportation route and source of hydroelectric power.

[UPSC 2009] Which one of the following pairs is not correctly matched?

City	River
a) Berlin	Rhine
b) London	Thames
c) New York	Hudson
d) Vienna	Danube

Answer: a)

[UPSC 2005] Match List-I with List-II and select the correct answer using the codes given below the lists:

List-I (City)	List-II (River)
A. Washington, D.C.	1. River Manzanares
B. Berlin	2. River Seine
C. Paris	3. River Spree
D. Madrid	4. River Potomac

Codes:

a) A-2; B-3; C-4; D-1
b) A-4; B-1; C-2; D-3
c) A-2; B-1; C-4; D-3
d) A-4; B-3; C-2; D-1

Answer: d) A-4; B-3; C-2; D-1

6.1.3. Major Inland Waterways in Europe

Volga-Baltic Waterway (Mariinsk Canal)	• The Volga-Baltic Waterway links the **Volga River** with the **Baltic Sea**. • It connects the **Caspian Sea** to the **Atlantic Ocean**.
Volga-Don Shipping Canal	• The Volga-Don Shipping Canal connects the **Volga River** and the **Don River** at their closest points.

	• It provides the most direct navigable connection between the **Caspian Sea** and the world's oceans via the **Sea of Azov** and the **Black Sea**.
White Sea-Baltic Canal	• Connects the **White Sea** to **Lake Onega**, which joins the Volga-Baltic Waterway.
Main-Danube Canal	• Connects the **Main River** (a tributary of the **Rhine River**) to the **Danube River**, creating a waterway between the **North Sea** (Atlantic Ocean) and the **Black Sea**.
Rhone-Rhine Canal	• Connects the **Rhine (at Basel)** to the **Rhône (Saone River)** and **connects the North Sea** and the **Mediterranean**.
Amsterdam-Rhine Canal	• Connects the **port of Amsterdam** with the **Rhine River** and establishes transit with the **Ruhr area of Germany**.
Marne-Rhine waterway	• Connects the **Paris Basin** with the industrial regions of **Alsace-Lorraine**.

Finland
Helsinki
G. of Finland
Tallinn
Estonia
of Riga
Riga
Latvia
Vilnius
Lake Onega
Lake Ladoga
Neva
Saint Petersburg
Rybinsk Reservoir
Volga
Russia
Moscow
Pechora
Kama
Minsk
Belarus
Kiev
Lviv
Ukraine
Kharkiv
Dnieper
Luhansk
Donetsk
Mariupol
Volgograd Reservoir
Volgograd
Don
Ural
Kazakhs
Moldova
Chisinau
Odesa
Romania
Bucharest
S. of Azov
Simferopol
Sevastopol
Kerch Strait
Aral S
Sofia
Bulgaria
Bosporus
Dardanelles
Istanbul
Black Sea
Caspian Sea
Georgia
Tbilisi
Armenia
Yerevan
Azerbaijan
Baku
Aegean Sea
S. of Marmara
Ankara
Turkey
Lake Van
Garabogaz Bay
Turkmenis
Cyclades

©PMF IAS
Hamburg
Netherlands
Amsterdam
Berlin
Frankfurt
Rotterdam
Duisburg
GERMANY
London
Dortmund
Rhine River
Cologne
BELGIUM
Koblenz
Frankfurt
Prague
Mainz
Luxembourg
Mannheim
Main River
Neckar River
Paris
Mosel River
Nancy
Freising
Strasbourg
Freiburg
FRANCE
Basel
Rhine Waterway
SWITZERLAND

6.1.4. Major Lakes of Europe

Lake Ladoga

- It is the **largest lake in Europe** and is situated in **northwestern Russia**. It is navigable and is a vital connection between the **Volga River** and the **Baltic Sea**.

Lake Onega

- It is the second largest lake in Europe (**north-western Russia**). It is nestled between the iconic **Lake Ladoga** and the **White Sea**.

6.2. Geographical Regions of Europe

6.2.1. Baltic states (The Baltics, Baltic nations)

- The **Baltics** is a **geopolitical term** typically used to group the three countries on the eastern coast of the **Baltic Sea**: **Estonia**, **Latvia**, and **Lithuania**. The three countries **do not form an official union** but **cooperate in matters of security and defence**. All three countries are **members of NATO** (to counter the bullying by Russia), the **eurozone**, the **OECD**, and the **European Union**.

[UPSC 2005] Which one of the following countries does not border Lithuania?

a) Poland
b) Ukraine
c) Belarus
d) North Sea

Answer: b) Ukraine

[UPSC 2004] Latvia does not share its borders with which one of the following countries?

a) Russia
b) Estonia
c) Lithuania
d) Poland

Answer: d) Poland

6.2.2. Nordic Countries

Scandinavian Peninsula	• Geographical area consisting of mainland **Norway**, **Sweden** and **Northern Finland**.
Fennoscandia	• It is the geographical region comprising the **Scandinavian** and **Kola Peninsula**, **mainland Finland**, and **Karelia**, a small area of North-Western Russia.
Nordic Countries	• The Nordics are a **geographical** and **cultural region** in **Northern Europe**. The term includes **Denmark**, **Finland**, **Iceland**, **Norway** and **Sweden**, the **Faroe Islands** and **Greenland**, both parts of the **Kingdom of Denmark**. • The Nordic countries have much in common regarding their way of life, history, religion, and social structure.

Scandinavia	• **Scandinavia = Norway + Sweden + Denmark**. • In English usage, the term Scandinavia is sometimes used as a synonym or near-synonym for **Nordic countries** on the grounds that their inhabitants speak Scandinavian languages (related to Norway and Sweden).

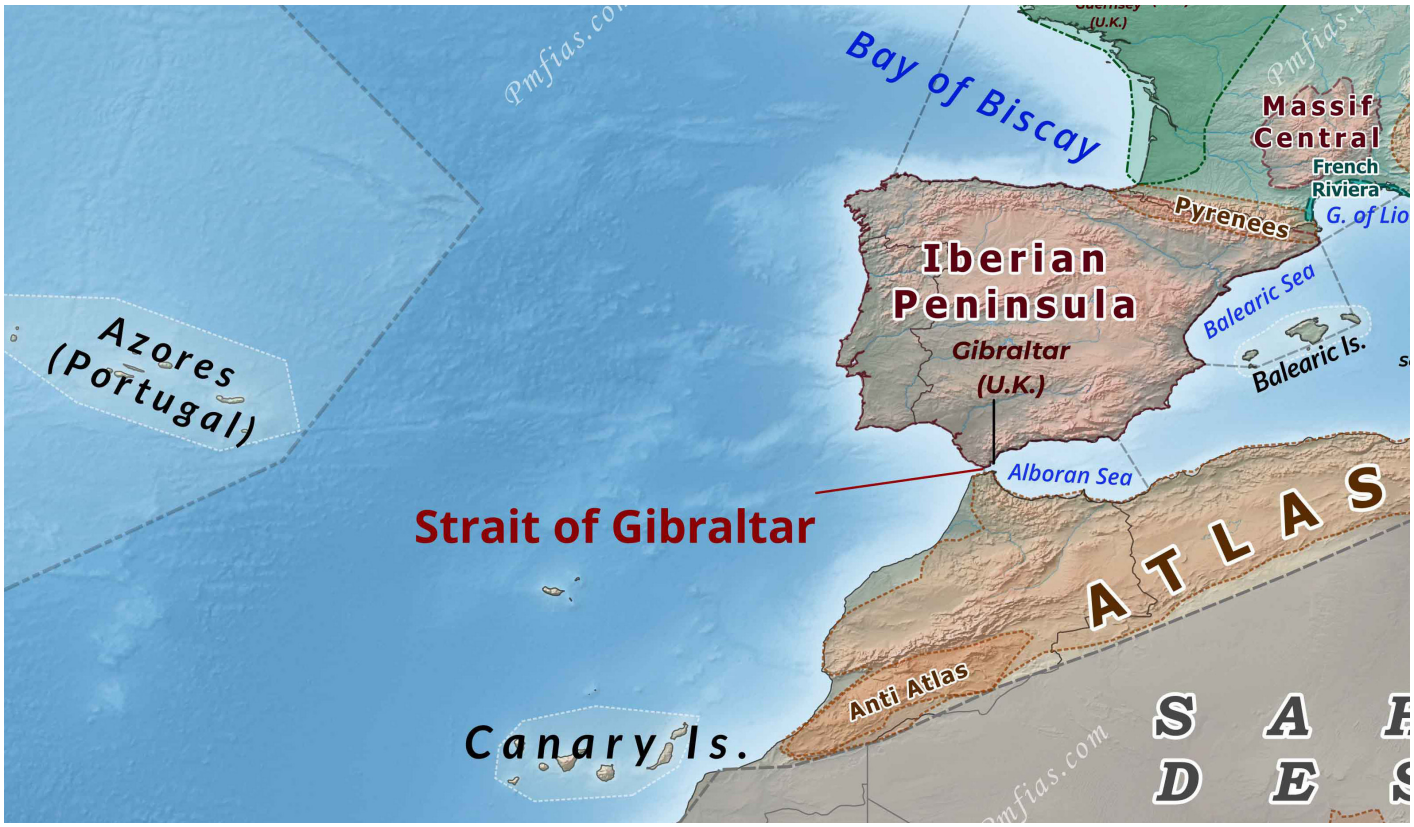
6.2.3. European Countries that were a part of the Erstwhile USSR

- **Baltic states:** Estonia, Latvia and Lithuania.
- **Eastern Europe:** Belarus, Moldova, Ukraine and Russia.
- The three Baltic states were the first to declare their independence from the USSR in 1990.

6.2.4. Balkans

- The **Balkans**, or **Balkan Peninsula**, is a region in **southeastern Europe** surrounded by the **Adriatic Sea**, the Mediterranean Sea, the **Aegean Sea**, and the Black Sea.
- The Balkans are usually characterised as comprising **Albania**, **Bosnia and Herzegovina**, **Bulgaria**, **Croatia**, **Kosovo**, **Montenegro**, **North Macedonia**, **Romania**, **Serbia**, and **Slovenia**. Moldova, parts of Turkey and Greece are also more commonly included in the Balkans.

6.2.5. Iberian Peninsula

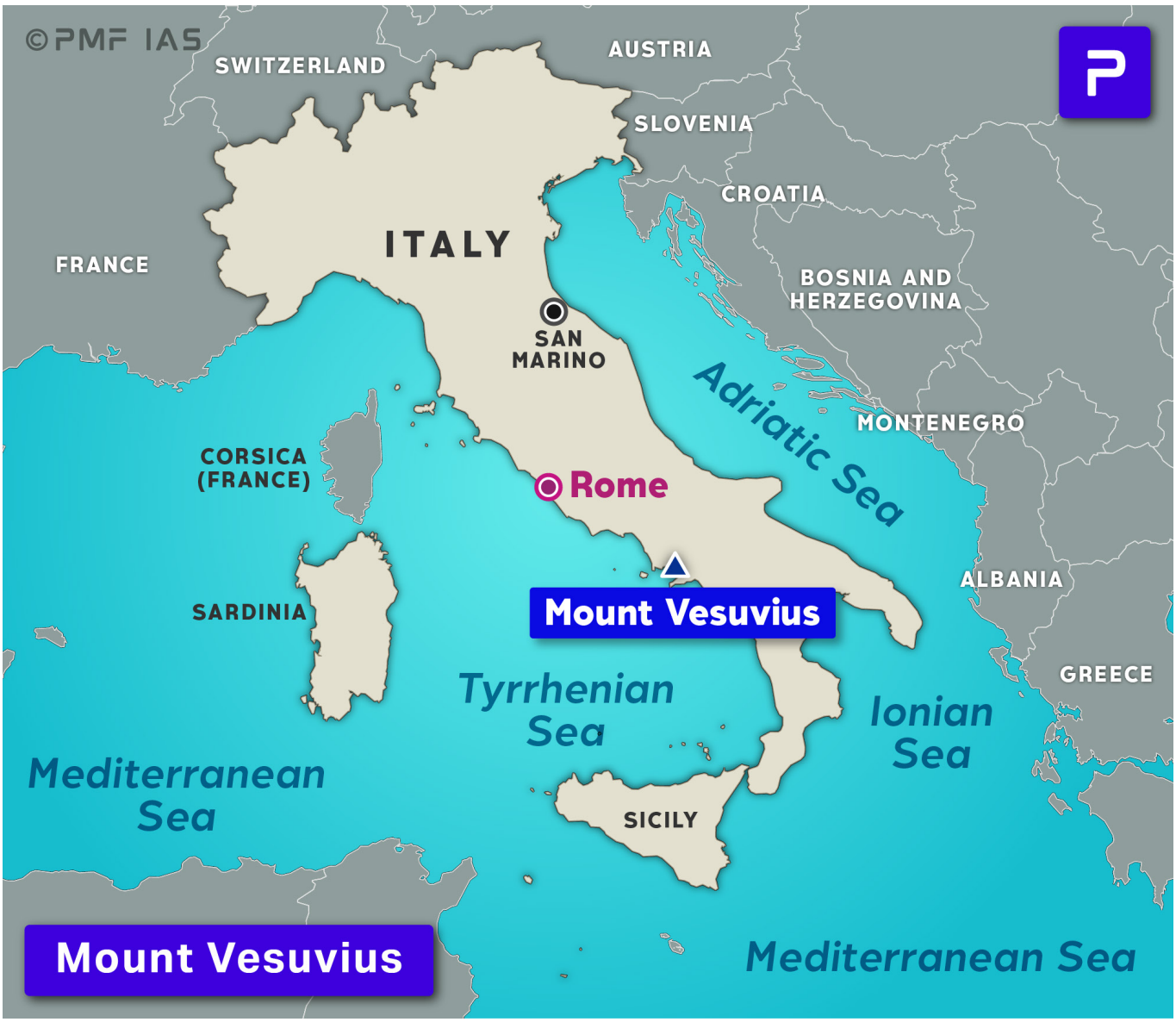


- The Iberian Peninsula consists of **Spain** and **Portugal**, as well as a small area of Southern France, **Andorra** and the **British overseas territory of Gibraltar**.
- The southern tip is separated from the African continent by the narrow **Strait of Gibraltar** (strait connecting the Mediterranean Sea to the Atlantic Ocean).

- In the north, it is bordered by the **Pyrenees Mountains**, which separate it from the rest of Europe.
- The **Meseta Central**, or **Inner Plateau**, covers about 75% of the Iberian Peninsula's total area.

6.2.6. Italian Peninsula (Apennine Peninsula)

- It is situated in southern Europe. It is bordered by the **Adriatic Sea** to the east, the **Ionian Sea** to the south, and the **Tyrrhenian** and **Ligurian seas** to the west. The peninsula encompasses most of **Italy** and includes the independent republic of **San Marino** as well as **Vatican City**.
- **Mount Vesuvius** is an **active volcano** located in southern Italy, rising above the **Bay of Naples** on the **Campanian plain**. The volcano is partially encircled by **Mount Somma**, a semicircular ridge rising to 1,132 metres, with the **Valle del Gigante** lying between them.



[UPSC 2008] In which one of the following is Malta located?

a) Baltic Sea

b) Mediterranean Sea

c) Black Sea

d) North Sea

Answer: b) Mediterranean Sea

[UPSC 2002] Consider the following countries:

1. Albania
2. Bosnia Herzegovina
3. Croatia
4. Macedonia

Which of these countries has/have the Adriatic Sea as a boundary?

a) 1, 2 and 4

b) 1, 2 and 3

c) 2 and 3

d) 1, 2, 3 and 4

Answer: b) 1, 2 and 3

6.2.7. Mediterranean Sea

Paris
France
Bordeaux
Lyon
Marseille
Matterhorn (4478)
Mont Blanc (4807)
Switzerland
Geneva
Basel
Zurich
Bern
Vaduz
Liechtenstein
Luxembourg
Stuttgart
Munich
Danube
Rhine
Czechia
Bratislava
Slovakia
Vienna
Austria
Budapest
Hungary
Ukraine
Dnieper
Moldova
Chisinau
Romania
Bucharest
S. of Azov
Kerch Strait
Black Sea
Milan
Venice
Florence
Pisa
Ljubljana
Slovenia
Zagreb
Croatia
Bosnia and Herz.
Sarajevo
Belgrade
Serbia
Sofia
Bulgaria
Pristina
Kosovo
Skopje
Macedonia
Podgorica
Montenegro
Tirana
Albania
Bay of Biscay
Ligurian Sea
G. of Lion
Monaco
Andorra
Spain
Portugal
Madrid
Barcelona
Valencia
Lisbon
Balearic Sea
Balearic Is.
Corsica (Fr)
Sardinia (IT)
Italy
Rome
Vatican City
Vatican
San Marino
Naples
Mt. Vesuvius (1281)
Adriatic Sea
Tyrrhenian Sea
Mt. Stromboli (1281)
Aeolian (Lipari) Is.
Sicily (IT)
Mt. Etna (3322)
Messina Strait
Strait of Sicily
Ionian Sea
Ionian Is.
Strait of Otranto
Greece
Mt. Olympus (2917)
Aegean Sea
Athens
Cyclades
Sea of Crete
Crete
Rhodes
Istanbul
Bosporus
S. of Marmara
Dardanelles
Ankara
Turkey
Gibraltar (U.K.)
Strait of Gibraltar
Alboran Sea
Oran
Algiers
Constantine
Tunis
Tunisia
Valletta
Malta
G. of Gabès
Tripoli
Benghazi
G. of Sidra
Rabat
Casablanca
Marrakesh
Mt. Toubkal (4165)
Agadir
Morocco
Algeria
Libya
Egypt
Alexandria
Cairo
El Giza
Suez
G. of Suez
G. of Aqaba
Strait of Tiran
Israel
Jordan
Dead Sea
Sea of Galilee
Lake Assad
Aleppo
Syria
Damascus
Beirut
Lebanon
Nicosia
N. Cyprus
Cyprus
U.N. Buffer Zone
Akrotiri (U.K.)
Dhekelia (U.K.)
Nazareth
Haifa
Tel Aviv-Yafo
Gaza
Ramallah
Amman
Palestine
Jerusalem
Levantine Sea
40°
30°

- The Mediterranean Sea is an intercontinental body of water stretching from the Atlantic Ocean in the west to Asia in the east, acting as a natural boundary between Europe and Africa.

Major Connections

- ⇨ **Atlantic Ocean:** Via the **Strait of Gibraltar**, only 13 km wide at its narrowest.
- ⇨ **Black Sea:** Linked through the **Dardanelles**, **Sea of Marmara**, and **Bosporus Strait**.
- ⇨ **Red Sea:** Connected by the **Suez Canal**.
- ⇨ **Indian Ocean:** Mediterranean Sea ➔ Sinai Peninsula, **Gulf of Aqaba**, Gulf of Suez ➔ Suez Canal ➔ Red Sea ➔ **Bab el Mandeb Strait** and the **Gulf of Aden** ➔ Indian Ocean

Physiography and Natural Divisions

- A submarine ridge between **Sicily** and North Africa splits the sea into the Western and Eastern Mediterranean.

Western Mediterranean

- ❖ **Alborán Basin:** East of Gibraltar, between Spain and Morocco.
- ❖ **Algerian Basin:** Extends from Algeria to France, also called the Algero-Provençal or Balearic Basin.
- ❖ **Tyrrhenian Basin:** Between Italy and the islands of Sardinia and Corsica.

Eastern Mediterranean

- ❖ **Ionian Basin:** South of Italy, Albania, and Greece; contains the deepest point (~4,900 metres).
- ❖ **Levantine Basin:** Lies south of Turkey and east of Cyrenaica (Libya).
- ❖ **Aegean Sea:** North of Crete, bordered by Greece and Turkey, containing the Grecian archipelago.
- ❖ **Adriatic Sea:** Northwest of the eastern basin, bordered by Italy and countries of the Balkan Peninsula.

[UPSC 2017] Mediterranean Sea is a border of which of the following countries

1. Jordan
2. Iraq
3. Lebanon
4. Syria

Select the correct answer using the code given below:

a) 1, 2 and 3 only
b) 2 and 3 only
c) 3 and 4 only
d) 1, 3 and 4 only

Explanation

- Mediterranean Sea bordering countries:
  - ❖ **22 countries** and one territory (**Gibraltar — a British Overseas Territory**) have coasts on the Mediterranean Sea.

- The European Countries are Italy, Malta, Monaco, Spain, Croatia, Bosnia and Herzegovina, Montenegro, Slovenia, Albania, France and Greece.
- The West Asian countries bordering the Mediterranean Sea are Turkey, **Lebanon**, **Syria**, Israel, the Palestinian Gaza Strip and the divided island of Cyprus.
- North African nations: Morocco, Algeria, Tunisia, Libya and Egypt.

Answer: c) 3 and 4 only

[UPSC 2015] Which one of the following countries of South-West Asia does not open out to the Mediterranean Sea?

a) Syria
b) Jordan
c) Lebanon
d) Israel

Answer: b) is correct

6.2.8. Wadden Sea

- The Wadden Sea is the **world's largest tidal flats system**, stretching along the coasts of Germany, Denmark, and the Netherlands. It is an **intertidal zone** in the southeastern part of the **North Sea**.
- It is the largest unbroken system of intertidal sand and mud flats in the world.
- It's a UNESCO World Heritage Site.

6.2.9. North Sea

- The North Sea is a shallow section of the **Atlantic Ocean** between Great Britain and northwestern Europe. It is bordered by England and Scotland (west), the Netherlands, Belgium, and France (south), and Norway, Denmark, and Germany (east).
- The North Sea connects to the Atlantic via the **English Channel**, the **Strait of Dover**, and the area between the **Shetland Islands** and Norway.
- It has one of the primary offshore drilling operations, especially in the UK and Norway, contributing significantly to global energy production. It is a hub for **offshore wind farms**, contributing to Europe's clean energy transition.
- It is **one of the richest fishing zones** in the world and a crucial maritime route for European trade, connecting major ports like **Rotterdam**, **Hamburg**, and **London**.

[UPSC 2024] Consider the following countries:

1. Finland
2. Germany
3. Norway
4. Russia

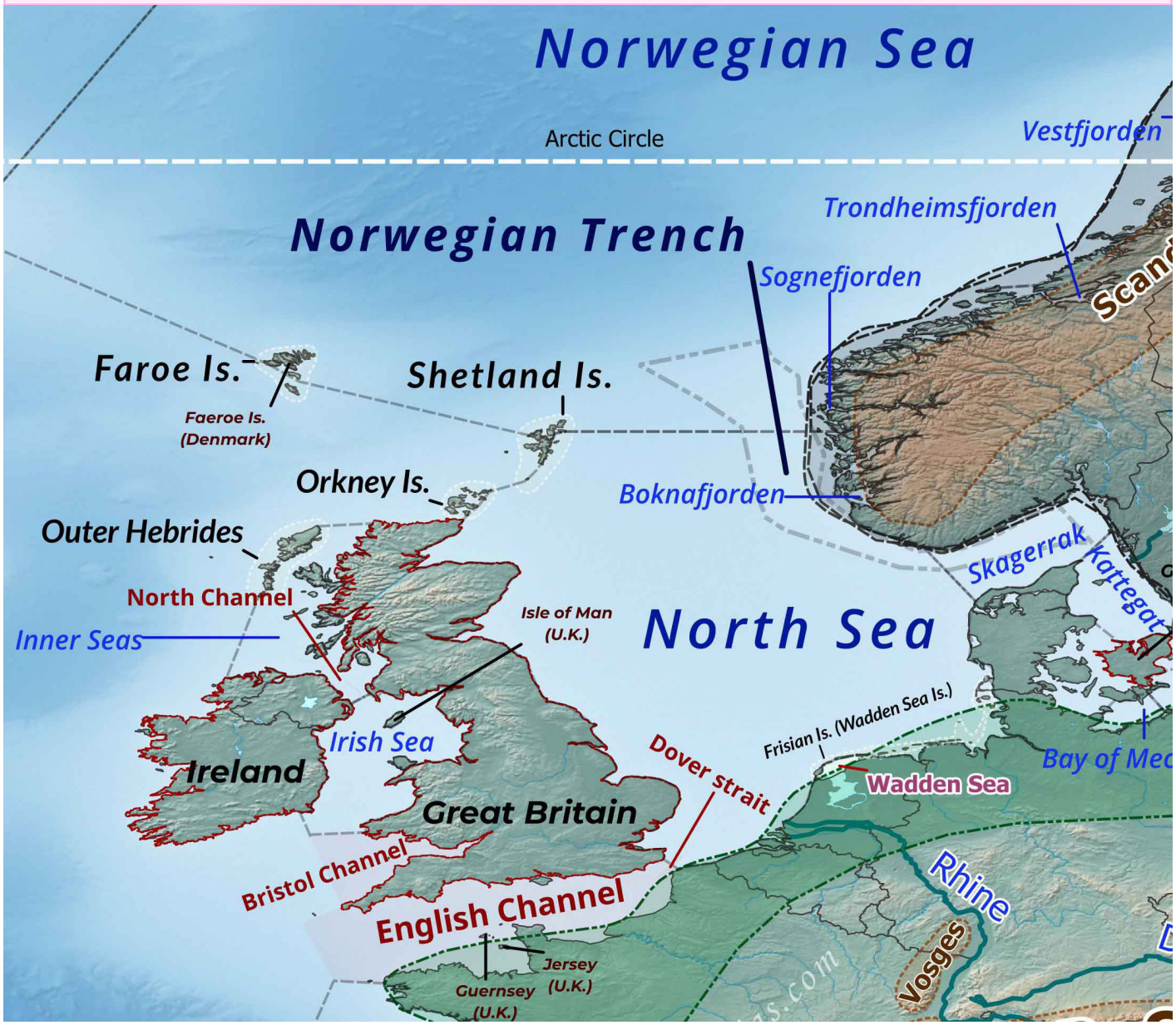
How many of the above countries have a border with the North Sea?

a) Only one
b) Only two
c) Only three
d) All four

Explanation

- It is bordered by **Great Britain** (southwest and west), the **Orkney and Shetland islands** to the northwest, **Norway** (northeast), **Denmark** (east), **Germany** and the **Netherlands** to the southeast, and **Belgium** and **France** to the south.

Answer: b) Only two



6.2.10. Erstwhile Yugoslavia

- Yugoslavia was a country that **came into existence after World War I** in 1918. It constituted the provisional State of **Slovenes**, **Croats** and **Serbs**. It was initially called the **Kingdom of Serbs**, **Croats**, **and Slovenes** before being renamed the Kingdom of Yugoslavia in 1929. The monarchy was replaced by the communist government in 1946 following World War II.
- The **six constituent republics** that made up Yugoslavia were:
  1. Bosnia and Herzegovina (50% of the population is Muslim),
  2. Croatia (majority Catholic Christians),
  3. Macedonia (majority Orthodox Christians),
  4. Montenegro (majority Orthodox Christians),
  5. Serbia (majority Orthodox Christians), and
  6. Slovenia (majority Catholic Christians).
- Serbia contained two autonomous provinces, Vojvodina and **Kosovo**.

Factors that led to the breakup of Yugoslavia

- Slavs speak various Slavic languages, which are divided into three groups: West Slavic, East Slavic, and South Slavic. The main South Slavic ethnic groups were the **Bosniaks** (predominantly Muslim), **Serbs** (predominantly Orthodox Christians), and **Croats** (predominantly Catholic Christians).
- Economic and political crisis in the 1980s (weakened communist regime after the death of Tito), ethnic, linguistic and religious conflicts among the Slavic ethnic groups and rise of nationalism led to the breakup of the Yugoslav state.
- Yugoslavia subsequently broke up along its republics' borders, at first into five republics. **Montenegro** and **Serbia** became independent states in **2006**.
- **Kosovo** proclaimed its independence from Serbia in 2008. It has since gained diplomatic recognition as a sovereign state by many UN member states. **Serbia** does not recognise Kosovo as a sovereign state. **India does not recognise Kosovo as an independent nation** (we have Kashmir and Khalistan to care for!).

Present

- **At present**, the erstwhile Yugoslavia is divided into:
  1. Bosnia and Herzegovina
  2. Croatia
  3. Kosovo (majority Albanian Muslims; minority Serbs)
  4. Montenegro
  5. North Macedonia (Macedonia until February 2019)
  6. Serbia
  7. Slovenia

[UPSC 2000] Consider the following provinces of former Yugoslavia:

1. Bosnia

2. Croatia
3. Slovenia
4. Yugoslavia

The correct sequence of these provinces from the east to west is:

a) 4, 1, 3, 2
b) 4, 1, 2, 3
c) 1, 4, 3, 2
d) 1, 4, 2, 3

Answer: b) 4, 1, 2, 3

6.2.11. Turkish Straits

- The Turkish Straits are two strategic waterways in northwestern Turkey that form a crucial link between the **Aegean** and **Mediterranean** seas and the **Black Sea**.
- The straits consist of the **Dardanelles** (connecting the **Sea of Marmara** with the **Aegean Sea**) and the **Bosphorus** (connecting the **Black Sea** and the **Sea of Marmara**).
- The Turkish Straits are considered the **boundary between Europe and Asia**, dividing European Turkey from Asian Turkey. They have been governed under the **Montreux Convention** since 1936.

6.2.12. Great European Plain

- The European Plain or Great European Plain is Europe's most prominent **mountain-free landform**. The plain stretches from the **Pyrenees mountains** and the French coast of the **Bay of Biscay** in the west to the Russian **Ural Mountains** in the east.
- In Western Europe, the plain is relatively narrow, around 320 km in width. Eastwards, it broadens considerably, reaching its widest point in western Russia at over 3,000 km.
- From northern France and Belgium eastward, the western and central parts of the European Plain are often called the **North European Plain**. In the east, it is generally known as the **Eastern European**, **or Russian Plain**, stretching from eastern Poland to the Ural Mountains.

6.2.13. Pannonian Basin

- The **Carpathians** and the **Transylvanian Alps** enclose the Pannonian Basin. Most of the basin consists of the **Great Hungarian Plain**. The **Danube River** divides the basin roughly in half.

6.2.14. Significant Geographical Features/Concepts of Europe

Polders

- A polder is a **lowland** reclaimed from water, typically the sea, by constructing dikes parallel to the shore and draining the enclosed area. Water is removed through tide gates, which operate during low tide, or by pumping for areas below low tide levels. The most renowned polder system is in the **Netherlands**.

- Diverting sediment-laden streams into the polder can elevate its bottom, aiding drainage. Newly reclaimed polder soil contains excessive salt, requiring desalination measures for agricultural use.

Machair

- Machair is a **fertile**, **low-lying**, **grassy plain** on the exposed **western coasts of Scotland and Ireland**. It is formed by **calcium-rich shell sand** blown ashore by Atlantic winds and supports diverse flora and fauna, shaped by traditional crofting practices.

The Blue Banana

- The **Blue Banana** is a **densely urbanised and industrialised region** in Europe, spanning from the United Kingdom through Belgium, the Netherlands, Germany, Switzerland, and northern Italy. The term reflects the banana-shaped region's industrial and urban character, symbolised by the colour blue.

[UPSC 2022] Consider the following pairs:

Region often mentioned in the news	*Country*
1. Anatolia -	Turkey
2. Amhara -	Ethiopia
3. Cabo Delgado -	Spain
4. Catalonia -	Italy

How many pairs given above are correctly matched?

a) Only one pair
b) Only two pairs
c) Only three pairs
d) All four pairs

Explanation

- Anatolia (**Asia Minor**) is a large peninsula in **Western Asia** that forms the Asian part of Turkey.
- **Amhara** is a region in **northern Ethiopia** and one of the nine ethnically based states of Ethiopia.
- **Cabo Delgado** is a province of **Mozambique**.
- **Catalonia** is an autonomous community in **northeastern Spain**.

Answer: b) Only two pairs

[UPSC 2019] Consider the following pairs:

Sea	*Bordering country*
6. Adriatic Sea -	Albania
7. Black Sea -	Croatia
8. Caspian Sea -	Kazakhstan
9. Mediterranean Sea -	Morocco

10. Red Sea - Syria

Which of the pairs given above are correctly matched?

a) 1, 2 and 4 only
b) 1, 3 and 4 only
c) 2 and 5 only
d) 1, 2, 3, 4 and 5

Answer: b) 1, 3 and 4 only

[UPSC 2018] Consider the following pairs:

Regions sometimes mentioned in the news	*Country*
1. Catalonia -	Spain
2. Crimea -	Hungary
3. Mindanao -	Philippines
4. Oromia -	Nigeria

Which of the pairs given above are correctly matched?

a) 1, 2 and 3
b) 3 and 4 only
c) 1 and 3 only
d) 2 and 4 only

Answer: c) 1 and 3 only

[UPSC 1995] Consider the map given below indicating four places frequently figuring in the news:

Which one of them is Chechnya? Choose the correct answer:

a) 1
b) 2
c) 3
d) 4

Explanation

- Chechnya is a republic in **southwestern Russia**, located on the northern slopes of the **Greater Caucasus Mountain range**.

Answer: c) 3[UPSC 2006] Claims to the historical Macedonian territory have been a bone of contention between which of the following countries?

a) Portugal and Spain
b) Bulgaria and Greece

c) Romania and Bulgaria

d) Portugal and Greece

Answer: b) Bulgaria and Greece

[UPSC 2022] Consider the following pairs:

The region often mentioned in the news	*Country*
1. Anatolia	Turkey
2. Amhara	Ethiopia
3. Cabo Delgado	Spain
4. Catalonia	Italy

How many pairs given above are correctly matched?

a) Only one pair

b) Only two pairs

c) Only three pairs

d) All four pairs

Explanation

- **Anatolia** (Asia Minor) is a historical & geographical region that covers most of the **Asian part of Turkey**.
- The **Amhara Region** is located in the northwestern part of Ethiopia. It is the homeland of the Amhara people. Amhara region is often mentioned in the news due to historical conflicts among Oromo, Amhara and Tigrayan groups of Ethiopia.
- **Cabo Delgado** is the northernmost province of **Mozambique**. It was in news because Mozambique's AlShabab extremist group has been carrying out attacks in the country's most northern province, Cabo Delgado, since 2017.
- **Catalonia** occupies a triangular area in the **northeastern corner of Spain**. In 2021, mass protests broke out across Spain's Catalonia region after its former separatist leader Carles Puigdemont was arrested.

Answer: b) Only two pairs

6.3. Recently In The News

6.3.1. Azores Islands

- The Autonomous Region of the Azores is a **Portuguese archipelago** of **volcanic origin** comprising nine islands in the North Atlantic Ocean. The archipelago, alongside **Madeira**, **Cape Verde**, and the **Canary Islands**, is part of **Macaronesia**.
- The Azores are located at the **seismically active Azores Triple Junction** plate boundary where the North American Plate, Eurasian Plate and African Plate meet. They created the largest marine protected area in the **North Atlantic**.

- **Mount Pico**, located on **Pico Island**, is the highest point on the archipelago. The **vineyard landscape** of Pico Island has been recognised as a UNESCO World Heritage Site.

6.3.2. Belgium recognises Ecocide

- Belgium becomes the first on the European Continent to recognise Ecocide as a crime. **Ecocide** refers to the **destruction of the natural environment** caused by intentional or negligent human activities.

Belgium

- It borders the Netherlands, Germany, Luxembourg, France and North Sea.
- It is the founding members of the European Union, the Eurozone, **NATO**, **OECD**, and **WTO**.
- **Capital:** Brussels. Also, it is the de facto capital of the **European Union** and the **headquarters of NATO**.

6.3.3. Moldova

- European country Moldova joins the **International Solar Alliance (ISA)**.
- **Location:** It is a landlocked country in **Eastern Europe**, bordered by Romania and Ukraine.
- **Geography:** Moldova is mostly **hilly plains** with fertile lands. It has a well-developed network of rivers and streams, all draining to the **Black Sea**.
- **Capital:** Chișinău.

6.3.4. Little Prespa Lake

- **Little Prespa Lake** in **Europe** has been transformed into **swamps** or dried up.
- **<u>Location:</u>** It is situated on the border between **Greece** and **Albania**.
- **<u>It consists of two lakes:</u>**
  1. **Great Prespa Lake** (shared by Albania, Greece, and North Macedonia).
  2. **Small Prespa Lake** (Mostly in Greece with a small tip in Albania).
- The **Little Prespa Lake** is one of the **oldest tectonic lakes** in Europe and the highest tectonic lake on the **Balkan Peninsula**. The lake is part of the **Prespa National Park** and is designated as a Ramsar Wetland. It is home to the Dalmatian pelican's largest breeding colony.

6.3.5. Our Living Islands campaign by Ireland

- Ireland's government has announced the launch of its "**Our Living Islands policy**", which is an effort to **revive Ireland's island communities** that aren't connected to the mainland. It aims to improve infrastructure and increase job opportunities, including the option for remote work.

About the Republic of Ireland

- Located on Ireland island in the **North Atlantic Ocean**, the second-largest island in the British Isles and the third-largest in Europe. The island is politically divided into the **Republic of Ireland** and **Northern Ireland**, part of the **United Kingdom**.
- **Language:** **Irish** (or Gaelic) is the official first language of the Republic of Ireland, although English is more commonly spoken. **Dublin** is a UNESCO City of Literature.
- **Bordering Countries:** It shares only a land border with Northern Ireland.

6.3.6. Santorini Island

- Greece has declared a state of emergency on Santorini due to frequent earthquakes shaking the island and nearby **Aegean** islands.
- Santorini (Thera) is a **volcanic crater island** in the **Southern Aegean Sea**, southeastern **Greece**. It features an **active volcano** and a sea-filled **volcanic caldera**. It is known for its whitewashed houses, blue waters, dramatic views, stunning sunsets, and the ancient settlement of Thira.
- **1956 Amorgos Earthquake:** Deadly earthquake and tsunami; 54 casualties, villages destroyed.

6.3.7. Thames River

- Two dolphins were found dead on the River Thames bank.
- **Source:** Thames Head, England. Flows through **London**.
- **Mouth:** North Sea (Southern England).

---------- End of Chapter ----------

7. Australia

Area	• 8.6 million km^2 (5% of the world's land area) • The continent includes mainland **Australia**, **Tasmania**, the island of **New Guinea** and some other nearby islands. • It is the **smallest continent** by area and by population. • Australia (country) alone accounts for 7.68 million km^2 (the 6th largest country). It is technically the **world's largest island**. However, it is more commonly considered a continental landmass. Hence, **Greenland** is regarded as the **world's largest island**.
Longitudinal Extent	• 113° E to 153° E (~4000 km)

Latitudinal Extent	• 10° S to 43° S (~3860 km)
Coastline	• 59,681 km (~34,000 km of mainland coastline)
Neighbouring countries of Australia (country)	• Indonesia, **East Timor**, and **Papua New Guinea** are to the north. • The **Solomon Islands**, **Vanuatu** and the **French dependency of New Caledonia** to the east and **New Zealand** to the southeast.
Major cities	• **In decreasing order of population:** **Sydney (largest and most populated city in Australia)**, **Melbourne**, Brisbane, Perth, Adelaide, Canberra (Capital City), Hobart and Darwin. • **From north to south:** Darwin, Brisbane, Perth, Sydney, Adelaide, Canberra and Hobart. • **From east to west:** Brisbane, Sydney, Canberra, Hobart, Adelaide, Darwin and Perth.
Major Islands	• **Tasmania** (also known as the **Apple Isle** for its cultivation of apples). It is a major **horticulture** region of Australia.
Largest Lake	• **Lake Eyre** (9,690 km^2). It is also the **lowest point** (15m below sea level)
Highest Mountain	• **Mawson Peak** (2,745 m) (Located in Heard Island, an external Australian territory near Antarctica) • **Mount Kosciuszko** (2,228 m) in mainland Australia, New South Wales.
Longest River	• **Murray River** (~2,500 km)
Vegetation	• Tropical rainforests in the northeast, temperate forests in the eastern highlands, snow-capped mountains of the Australian Alps and Tasmania, and extensive interior deserts. • Australian temperate forests (eastern Australia) are mostly made up of **evergreen eucalyptus trees**.
Notable Fauna	• **Platypus** and **echidna** — the **only egg-laying mammals on Earth**. • **Marsupials:** **Kangaroo** (National Animal of Australia), **Tasmanian devil**, etc.
Facts	• Australia is the largest country in Oceania and the Southern Hemisphere. It is **the largest country without land borders**. • **Cape York** is the northernmost point of the Australian Mainland. • The southernmost point is the **South East Cape** (part of Tasmania). • Australia is the **only continent without glaciers**. • Australia is the only continent **without any active volcanoes** (but has extinct volcanoes).

[UPSC 2009] Consider the following countries:

1. Australia
2. Namibia

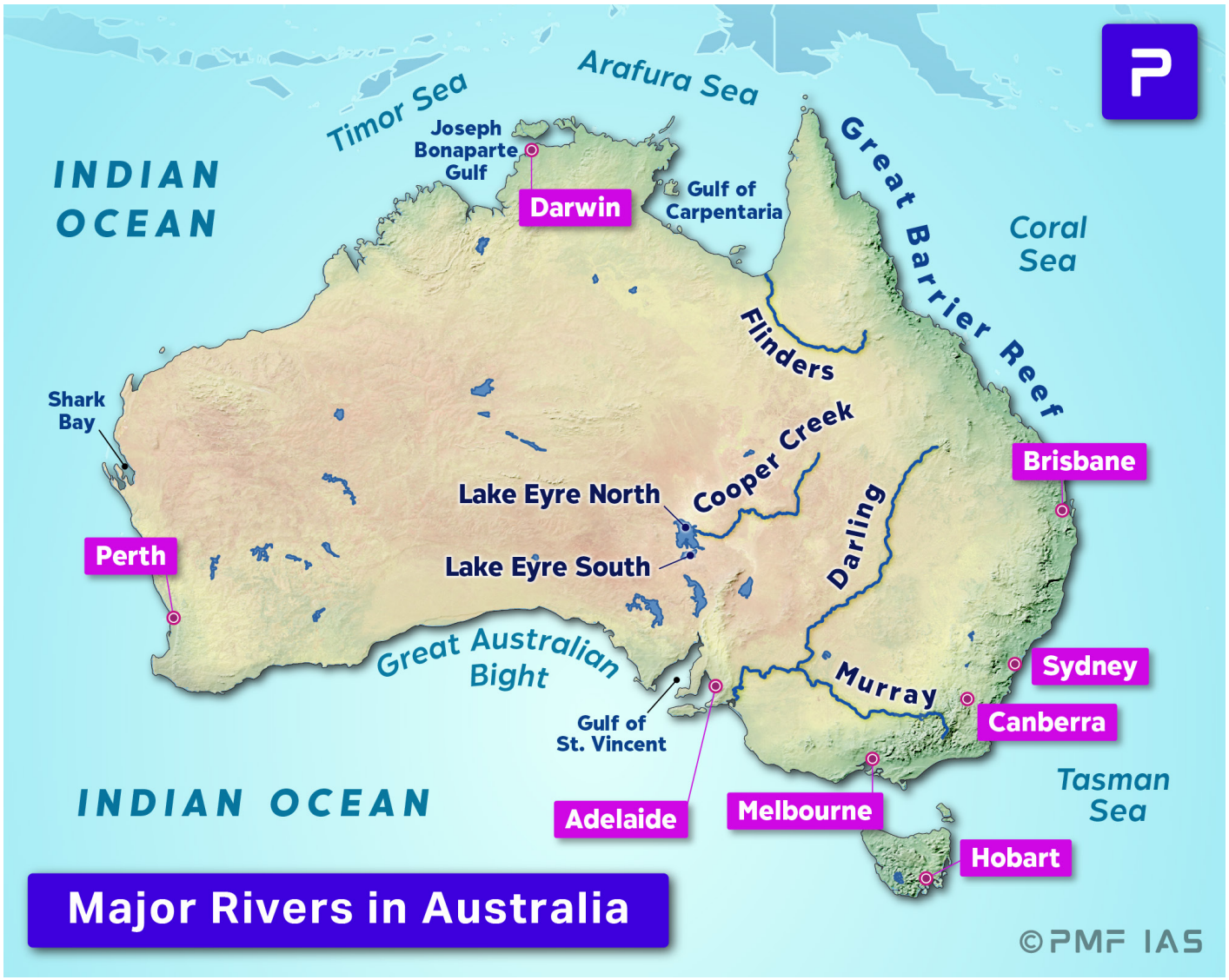
3. Brazil
4. Chile

Through which of the above does the Tropic of Capricorn pass?

a) 1 only
b) 2, 3 and 4
c) 1, 2 and 3
d) 1, 2, 3 and 4

Answer: d) 1, 2, 3 and 4

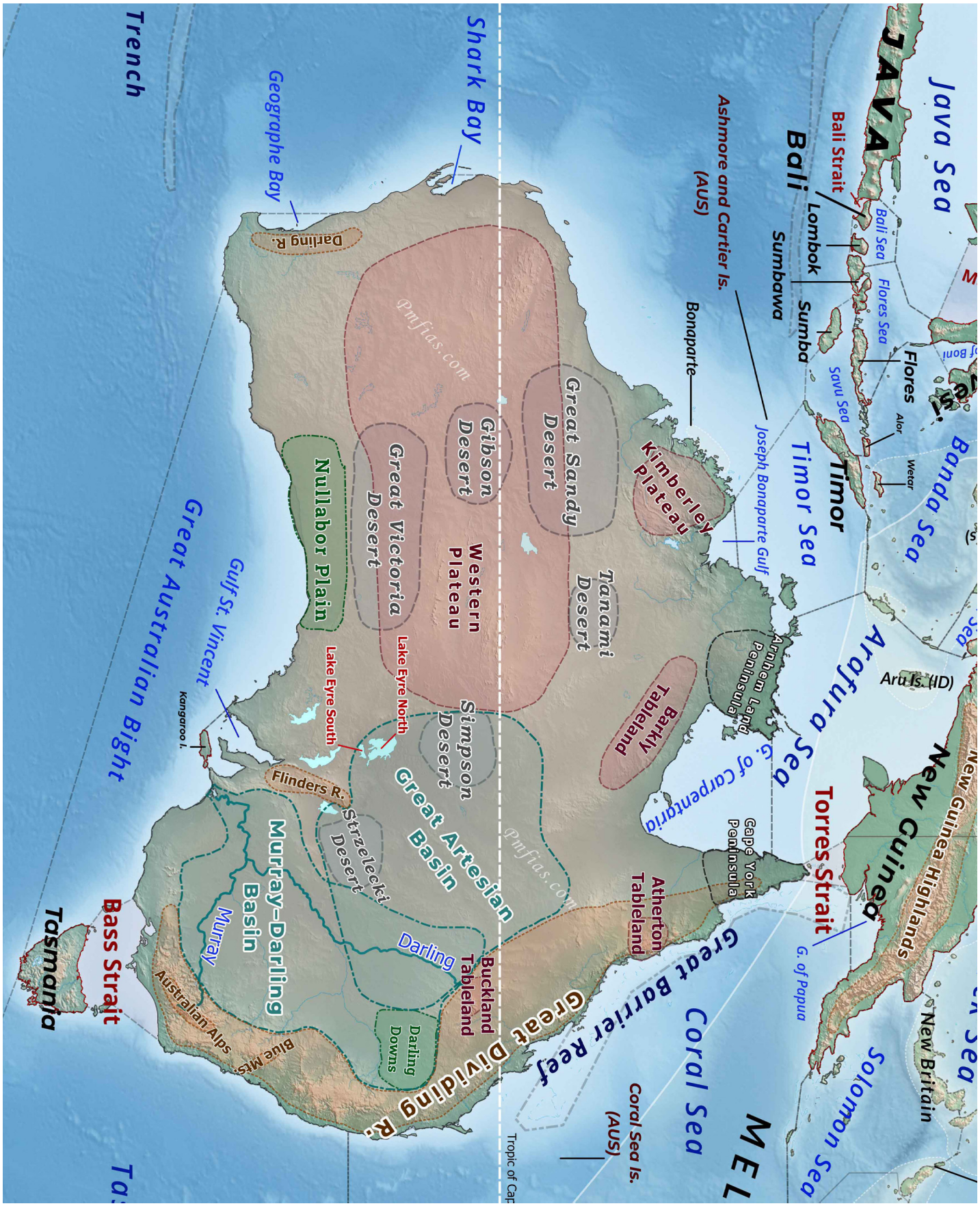
7.1. Major Rivers of Australia



7.1.1. Murray River

- It is the **longest river in Australia**, with 2,508 km.
- It is the **third longest navigable river in the world** (**1st – Amazon River**; **2nd – Nile River**).

Java Sea
Jakarta
JAVA
Mt. Merapi
(2968)
Bali Strait
Bali
Bali Sea
Lombok
Sumbawa
Sumba
Flores Sea
Mt. Tambora
(2722)
Flores
Savu Sea
Alor
Wetar
Dili
East Timor
Banda Sea
Timor Sea
Indian Ocean Ter.
(AUS)
Ashmore and Cartier Is.
(AUS)
Joseph Bonaparte Gulf
Bonaparte
Darwin
Arafura Sea
Aru Is. (ID)
New Guinea
Papua New Guinea
G. of Papua
Mount Victoria
(4038)
Port Moresby
Torres Strait
New Britain
Solomon Sea
Bougain
New
G. of Carpentaria
Coral Sea
Coral Sea Is.
(AUS)
Newcastle Waters
Tropic of Capricorn
Shark Bay
Uluru (Ayers Rock)
(863)
Australia
Lake Eyre North
Lake Eyre South
Darling
Sunshine Coast
Brisbane
Gold Coast
Kalgoorlie
Perth
Geographe Bay
Gulf St. Vincent
Adelaide
Kangaroo I.
Murray
Mt. Kosciuszko
(2228)
Canberra
Sydney
Melbourne
Great Australian Bight
Bass Strait
Tasmania
Hobart
Tasman
MELAN
0°
20°
30°
40°



- It is part of the **Murray-Darling Basin** (which covers 14% of Australia's total area). The basin produces 95% of Australia's **Oranges** and 54% of its **Apples**.

Source	• **Pilot Mountain**, New South Wales.
Mouth	• **Murray Mouth**, Goolwa, South Australia.
States through which it passes	• New South Wales, Victoria, and South Australia.
Main Tributaries	• **Darling**, **Murrumbidgee**, Loddon, etc.
Important Cities	• Swan Hill and Murray Bridge.
Important Dams/Reservoirs	• **Hume Reservoir** and Lake Alexandrina (lagoon).

Darling River

- The Darling River (~1,545 km) is a **tributary of the Murray River** and the **second-largest river** in Australia (part of the Murray-Darling Basin). The source is **several streams** from the **Great Dividing Range**. It is home to a significant golden perch (freshwater fish) population.

Source	• Confluence of **Barwon and Culgoa rivers (New South Wales)**.
Mouth	• **Murray River** at Wentworth (**New South Wales**).
States through which it passes	• New South Wales.
Important Cities	• Brewarrina (source point) and **Bourke**.

Murrumbidgee River

- The Murrumbidgee River (~1,485 km) is a **right-bank tributary of the Murray River**. This river basin contributes to **more than 50% of Australia's rice production**.

Source	• **Western Slopes of the Great Dividing Range**, New South Wales.
Mouth	• **Murray River** near Balranald (New South Wales).
States through which it passes	• New South Wales.
Important Cities	• **Canberra** and Griffith.

Lachlan River (~1,339 km)

Source	• **Great Dividing Range**, near Gunning, New South Wales.
Mouth	• **Murrumbidgee River** near Oxley, New South Wales.
States through which it passes	• New South Wales.

7.1.2. Cooper Creek

- Cooper Creek (~1,113 km) is an **inland river system** in central Australia. It is an intermittent river that flows only during seasonal rains.

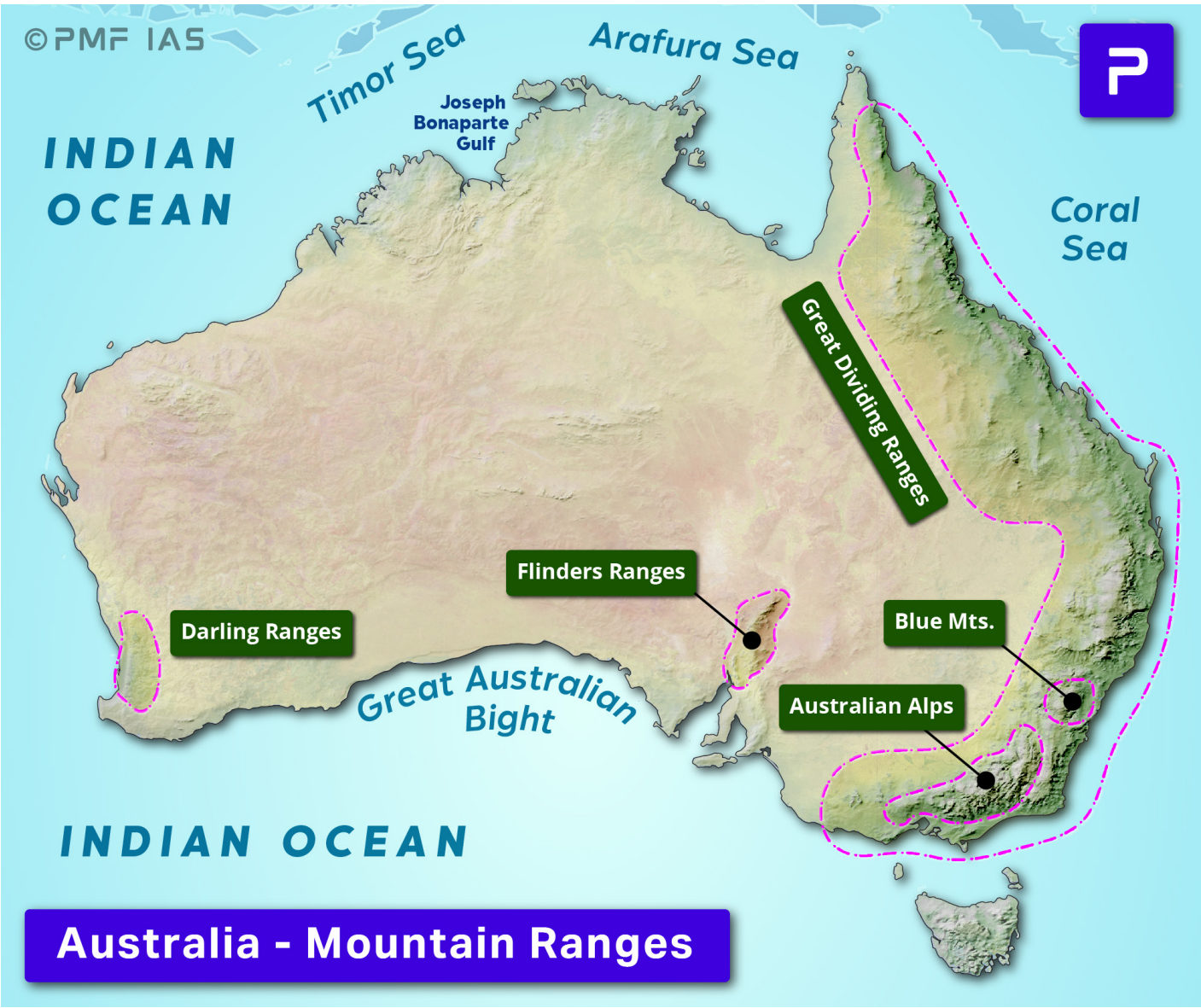
Source	• **Barcoo and Thomson Rivers confluence**, southwest Queensland.
Mouth	• **Lake Eyre basin** (internal drainage basin).
States through which it passes	• Queensland and South Australia.
Important Dams/Reservoirs	• **Lake Coongie** and **Lake Eyre**.

7.1.3. Flinders River

- The Flinders River (~1,004 km) is one of the longest **inland and intermittent** river systems. It is a part of the **Gulf of Carpentaria drainage basin**.

Source	• **Drummonds Range** (Great Dividing Range), Queensland.
Mouth	• **Gulf of Carpentaria**, near the town of Karumba, **Queensland**.
States through which it passes	• Queensland.

7.2. Major Mountain Ranges of Australia



Mountain Range	Location	Highest Peak	Notable Features
Great Dividing Range	**Eastern Australia**, running parallel to the east coast	**Mount Kosciuszko** (2,228 m) is the highest peak of mainland Australia.	• **Longest mountain range in Australia** (also known as Eastern Highlands) • It is a **series of mountains and highlands** (~ 3,000 km) from **northern**

			Queensland to the northern part of Victoria. • It divides coastal (rivers that flow into the Tasman Sea) and west drainage systems (E.g., Murray-Darling basin). • The Great Dividing Range reaches its greatest heights in the **Australian Alps**. • The Alps, particularly the **Victorian Alps**, are periodically subject to major **bushfires**.
Australian Alps	Southeastern New South Wales and eastern Victoria	Mount Kosciuszko (2,228 m)	• **The highest mountain range in Australia**. • It is part of the Great Dividing Range. • **Mount Bogong** (~1986 m) is another notable peak. • **Snowy Mountains** are part of this range.
Flinders Ranges	South Australia	**St Mary Peak** (1,171 m)	• **Rugged**, **ancient mountain range**. • Flinders Ranges National Park and Gammon Ranges National Park are part of it.
MacDonnell Ranges	Central Australia, Northern Territory	**Mount Zeil** (1,531 m)	• Consists of parallel ridges running east-west. • Formed by the folding and uplifting of **ancient sedimentary rocks**. • Simpsons Gap, Standley Chasm, and Ellery Creek Big Hole are the notable features.
Hamersley Range	Western Australia	Mount Meharry (1,235 m)	• Part of the **Pilbara region**. • It is known for **iron ore deposits** (Brockman Iron Formation and the Marra Mamba Iron Formation)
Musgrave Ranges	Western Australia and South Australia border	**Mount Woodroffe** (1,435 m)	• One of the most isolated major mountain ranges in Australia. • Consists of rugged quartzite and granite ridges.

Stirling Range	Southwestern Western Australia	Bluff Knoll (1,095 m)	• Consists of rugged and scenic quartzite peaks, ridges, and cliff faces. • Parts of the range are protected within the **Stirling Range National Park**.
Blue Mountains	Western Sydney, New South Wales	Mount Bindo (1,144 m)	• **Part of the Great Dividing Range**. • Formed from uplifted and eroded sandstone plateaus. • Parts of the range are protected within the **Blue Mountains National Park**.
Darling Range	Western Australia	Mount Cooke (582 meters)	• It is a **low plateau and escarpment** that runs parallel to the west coast.

7.3. Major Deserts in Australia

- Australia is the **driest inhabited continent**.
- **Deserts and arid lands cover about 70% of the Australian continental landmass**, mostly in the western and central regions of the country.

7.3.1. Great Victoria Desert

- The **Great Victoria Desert (Australia's largest desert)** covers parts of western and southern Australia.
- It is a vast **sandy desert** with **parallel dune systems** running **east-west**.
- It is characterised by sand hills, salt lakes, spinifex grass, etc.
- **Nullarbor Plain**, one of the world's largest limestone bedrock plains, is located to the south.

[UPSC 2009] Match List I with List II and select the correct answer using the code given below the lists:

List-I (Geographic feature)	List-II (Country)
A. Great Victoria Desert	1. Australia
B. Grand Canyon	2. Canada
C. Lake Winnipeg	3. New Zealand
D. Southern Alps	4. USA

Codes:

a) A-1; B-2; C-4; D-3
b) A-1; B-4; C-2; D-3
c) A-3; B-2; C-4; D-1
d) A-3; B-4; C-2; D-1

Answer: b) A-1; B-4; C-2; D-3

7.3.2. Gibson Desert

- It is located in **Western Australia** to the north of the Great Victoria Desert.
- It is characterised by extensive **sand ridges** and **dune fields**, with areas of exposed bedrock.

7.3.3. Great Sandy Desert

- It spans parts of **Western Australia and the Northern Territory**.
- It is characterised by **red sand plains**, **dune fields** and **remnant rocky outcrops**.
- **Lake Disappointment** and **Lake Dora** are notable salt lakes.
- The predominant vegetation is **spinifex grasslands**, **low woodlands and shrubs**.

7.3.4. Tanami Desert

- It covers parts of the Northern Territory and Western Australia.
- It is characterised by **rocky terrain with small hills**.
- It consists of rocky outcrops, red plains, and red sand dunes.

7.3.5. Simpson Desert

- It spans parts of the **Northern Territory**, **Queensland**, **and South Australia**.
- **Sand dunes** and **Ephemeral salt lakes** are common along with **seasonal rivers** (E.g. Todd, Plenty, etc.)
- It is located within **Munga-Thirri–Simpson Desert National Park**.

7.4. Other Important Geographical Features in Australia

7.4.1. Great Artesian Basin (GAB)

- It is Australia's most significant **hydrogeological system**, covering an area of 1.7 million km^2 (**one-fifth of the Australian continent**) and **one of the largest underground freshwater resources** in the world.
- It underlies parts of **Queensland**, **New South Wales**, **South Australia**, **and the Northern Territory**.
- Basin water **emerges through cracks** in the rock, forming springs, creeks, and rivers, **providing a permanent water source even during dry periods**. Most springs and leakages occur on the edges of the Basin where water is close to the surface.
- The GAB comprises the **Eromanga**, **Surat**, and **Carpentaria geological basins**.
- Groundwater from the GAB supports huge economic activities, catering to pastoral, agricultural, and extractive industries, as well as town water supplies.

7.4.2. Nullarbor Plain

- It is located on the **Great Australian Bight** in **Southern Australia**.
- It is the **world's largest single piece of limestone**, covering an area of 270,000 sq. km.
- The plain **features slight depressions** where sparse rainfall has dissolved away some of the limestone, as well as **sinkholes** and **collapsed underground caves**, creating dents in the surface.
- It is horizontally flat and **devoid of trees** (Latin words nulla, meaning 'no', and arbor, meaning 'tree').
- The Nullarbor Plain **ends abruptly** at the spectacular **Bunda Cliffs** (a 200 km long precipice curving around the Great Australian Bight) and reveals layers of rock formations.
- At the base of the cliffs is the **white Wilson Bluff Limestone**, a chalky material formed from an ancient seabed when Australia separated from Antarctica 65 million years ago.

7.4.3. Lake Eyre

- It is a **Salt Lake of tectonic origin** located in South Australia.
- Lake Eyre constitutes the **lowest point on the Australian continent** (15 m below sea level).
- It consists of two main sections, **Lake Eyre North** and **Lake Eyre South**, which are joined by the narrow **Goyder Channel**.
- The lake is fed by a **vast internal continental drainage basin** but receives very low and intermittent rainfall of less than 125 mm annually.
- Water reaching the lake evaporates rapidly, leaving a thin crust of salt on the lake bed's surface.

7.4.4. Pilbara Region

- The Pilbara is a **vast geographic region in Western Australia** known for its ancient landscapes and rich natural resources, especially iron ore.
- **Karratha** and **Port Hedland** are the key regional centres in the Pilbara.
- It is home to one of the **world's largest collections of Aboriginal engraved rock art**.

7.4.5. Kimberley Plateau

- It is located in the **Kimberley region** of **northern Western Australia**.
- It comprises **flat-lying sedimentary rocks** (sandstones and quartzites) deposited around 1.8 billion years ago by major river systems. It also contains considerable volumes of concordant **basalt lava flows**.
- **Many minerals**, **such as iron**, **gold**, **lead**, **zinc**, **silver**, **and diamonds**, **are found here**. The **Argyle Diamond Mine in the East Kimberley region** is one of the largest producers of diamonds in the world.

7.4.6. Great Barrier Reef

- It is located on the **northeast coast of Australia (extending over 2,300 km)**, and it contains the **world's largest (and longest) collection of coral reefs**.
- It has over 400 types of coral, 1,500 species of fish, and 4,000 types of molluscs.
- It is home to animals like dolphins, turtles, crocodiles, sharks, venomous sea snakes, brightly coloured worms, and large algae. The reef is also home to threatened species like the **dugong** ('sea cow') and the **large green turtle**.
- A 2018 study revealed that **coral bleaching had severely degraded around one-third of the expansive Great Barrier Reef ecosystem**.

[UPSC 2007] The largest coral reef in the world is found near the coast of which one of the following countries?

a) Australia
b) Cuba
c) Ghana
d) Philippines

Answer: a) Australia

[UPSC 2006] In which one of the following oceans Diamantine Trench situated?

a) Pacific Ocean
b) Atlantic Ocean
c) Indian Ocean
d) Arctic Ocean

Explanation

- The Diamantina Trench, also known as the **Diamantina Fracture Zone**, stretches westward from **Australia's southwest coast (Indian Ocean)**. This rift valley was created between 60 and 50 million years ago when Australia separated from Antarctica.

Answer: c) Indian Ocean

7.4.7. Tasmania

- Tasmania is an **island state** located off the **southeastern corner of the Australian mainland**.
- It is separated from the continental landmass by the **Bass Strait**, a 240-kilometer (150-mile) wide expanse of water stretching between the island and the Australian mainland's eastern extremity.
- The state comprises the main islands of Tasmania, Bruny Island, King and Flinders Islands, several smaller islands, and the **subantarctic Macquarie Island**.
- It is structurally a **southern extension of the Great Dividing Range** and has a rugged, mountainous terrain with a temperate climate.

7.4.8. Great Australian Bight

- It is a **marine environment** that stretches across the **southern coast of Australia**.
- **A bight is a long, gradual bend or recess in the shoreline that forms a large, open bay**.
- Over 85% of the known species in the region are endemic, making it a hotspot of biodiversity.
- The **Bight supports Australia's largest commercial fishery** and has an abundance of marine resources.

7.4.9. Outback

- The Outback refers to Australia's **remote inland areas**, particularly the semiarid regions of eastern Australia and the arid centre of the Western Plateau, including the MacDonnell, Musgrave, and Petermann ranges, as well as the Gibson, Great Sandy, Great Victoria, and Tanami deserts.
- The key features include scattered, often **dry water bodies** and landmarks like **Uluru/Ayers Rock**.
- It supports cattle and sheep grazing, opal mining, and minor natural gas and oil production.
- **Channel Country**, an outback region, is a pastoral region located mainly in southwestern Queensland.

7.4.10. Uluru (Ayers Rock)

- It is a **large sandstone rock formation (the world's largest monolith)** in central Australia.
- It **changes colour at different times of the day and year**, according to the position of the sun.

7.4.11. Billabong

- A billabong refers to a **water body**, typically formed when a river alters its course, leaving a disconnected section resembling a lake (Australian term for an **oxbow lake**). These features usually emerge after heavy rains or flooding when rivers breach loops in their course.

7.4.12. K'gari (Fraser Island)

- K'gari, also known as **Fraser Island**, is the **world's largest sand island**, located off Australia's east coast.
- The island features unique ecosystems, including **tall rainforests** growing on sand, shifting dunes, and half the world's perched **freshwater dune lakes**. It also hosts the largest unconfined aquifer on a sand island, showcasing exceptional biological, hydrological, and geomorphological processes.

7.4.13. Pink Lakes

- A pink lake is a natural water body that exhibits a vibrant pink hue, often due to specific **biological and chemical processes**. These lakes are visually striking and have fascinated both tourists and scientists.
- The pink colour in these lakes is primarily due to:
  - **Dunaliella salina:** A type of algae that thrives in high salt concentrations, producing beta carotene, which gives the water a reddish-pink hue.
  - **Halobacteria:** An extremophile bacterium that emits a red pigment and flourishes in intensely salty environments.
- These microorganisms contribute to the lake's distinct colour, especially in high-salinity conditions.
- **Lake Hiller** and Pink Lakes of **Murray-Sunset National Park**, Victoria, are the major examples.

7.5. Oceania

- Oceania has traditionally been divided into four parts:
  1. **Australasia** (Australia and New Zealand),
  2. **Melanesia**,
  3. **Micronesia**, and
  4. **Polynesia**.
- It consists of **thousands of volcanic islands and coral atolls**.
- Oceania can also be divided into three island groups based on the nature of the islands.

Island Group	Formation
Continental Islands	• These islands are formed from landmasses that were once attached to continents but **became isolated due to sea-level changes and tectonic activity**. • It is characterised by **various physical features**, such as mountains, highlands, and deserts. Examples are **Australia**, **Zealandia**, and **New Guinea**.
High Islands (Volcanic Islands)	• It is **formed through volcanic activity**, where eruptions build up land over time, resulting in **steep central peaks** and **radiating ridges and valleys**. It is part of the "**Ring of Fire**" in the Melanesia region. • **Examples:** **Mount Tomanivi (Fiji)**, Mount Lamington (Papua New Guinea), Mount Yasur (Vanuatu).

Low Islands (Coral Islands)	• It is formed from the **accumulation of coral reefs**, often barely reaching above sea level and sometimes forming **irregular rings of small islands** around a lagoon. It is dominant in the Micronesia and Polynesia regions. • **Examples:** **Kwajalein Atoll** (Marshall Islands) and **Kiribati** (composed of 32 atolls and one solitary island).

7.5.1. Melanesia

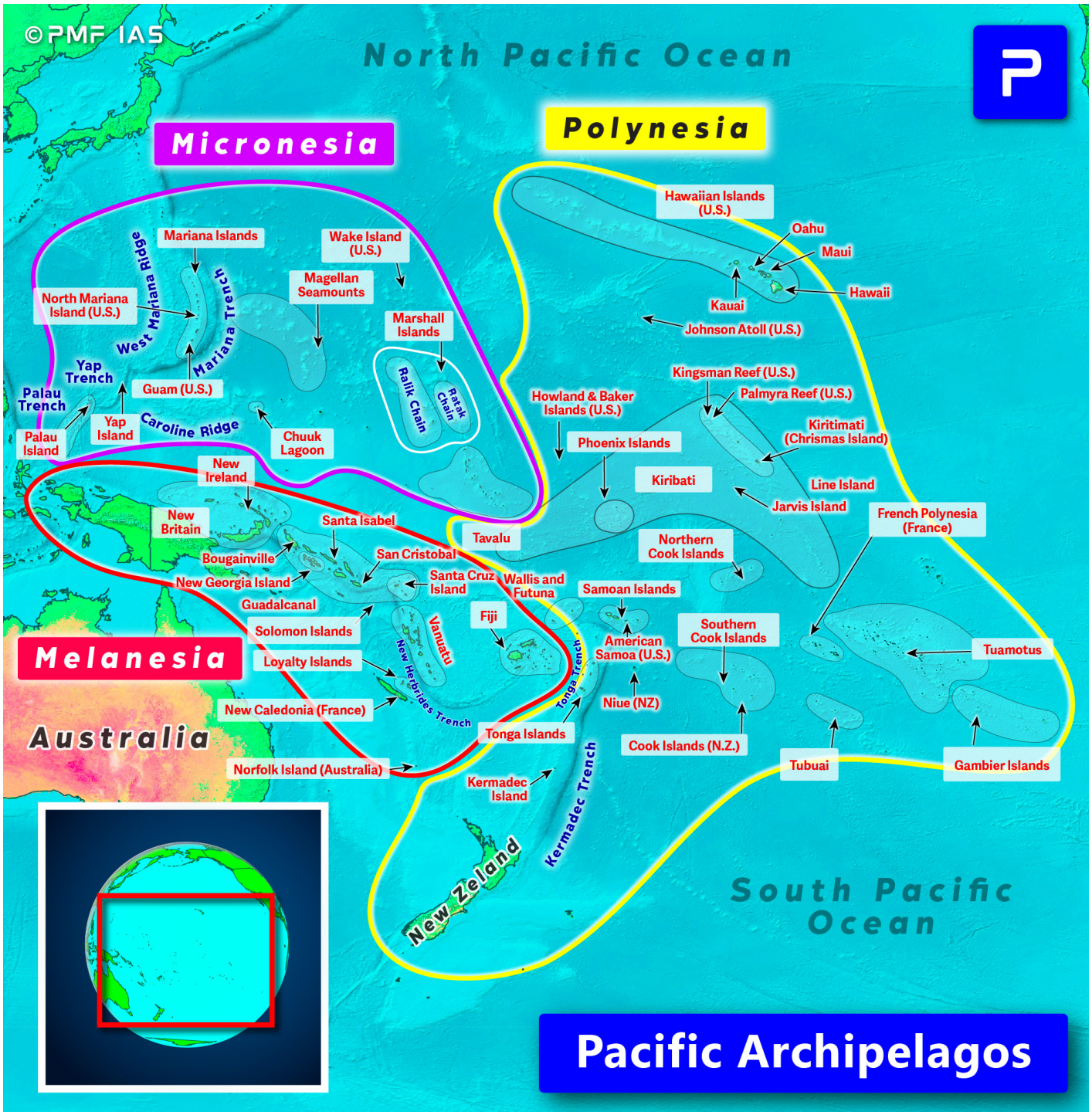
- Melanesia extends from **New Guinea** to **Tonga**.
- The region includes the independent countries of **Fiji**, **Vanuatu**, **Solomon Islands**, and **Papua New Guinea**, as well as the French special collectivity of New Caledonia and parts of Indonesia (Western New Guinea).
- Most of the region is in the **Southern Hemisphere**, with only a few small north-western islands of **Western New Guinea** lying in the Northern Hemisphere.
- The climate is predominantly **tropical and humid**, and the vegetation is rainforest.

Fiji

- Fiji is located in the **Pacific Ocean (north of New Zealand)** and is made up of a **group of volcanic islands**.
- **Viti Levu** (west of the Koro Sea) is Fiji's largest island, and **Vanua Levu** is its second-largest island.
- The British established the Colony of Fiji in 1874, and in the late 19th century, they **imported indentured labourers from India** to work on sugarcane fields. The British granted Fiji independence in 1970.
- The population of Fiji is mostly made up of native Fijians (54%) and **Indo-Fijians (38.1%)**.

7.5.2. Micronesia

- Micronesia is a **subregion of Oceania**, made up of thousands of small islands in the **western Pacific Ocean**. It is composed of several sovereign countries and territories, including the Federated States of **Micronesia**, **Palau**, **Guam**, **Northern Mariana Islands**, **Nauru**, **Kiribati**, **Marshall Islands**, and **Wake Island**.
- There are four main island groups in Micronesia. They are divided into six sovereign nations:
  1. The **Caroline Islands** (divided between Federated States of Micronesia and Palau);
  2. The **Gilbert Islands** (Republic of Kiribati);
  3. **The Mariana Islands** (Northern Mariana Islands and **Guam** are unincorporated territories of the **United States**; Guam is the largest island)
  4. The **Marshall Islands** (sovereign nation) (Wake Island is claimed by the Marshall Islands but controlled by the United States Air Force);
- **Nauru** is a small sovereign nation in the region.
- **Atolls** are the predominant landform in Micronesia. Some of the largest atolls in the world are found here. E.g. **Kwajalein Atoll in the Marshall Islands** and **Nukuoro Atoll in the Federated States of Micronesia**. It also has a few volcanic islands.



7.5.3. Polynesia

- Polynesia (Greek name – 'many islands') encompasses over a **thousand islands dispersed** across the **central and southern Pacific Ocean**.
- These are islands within a **triangle formed by the Hawaiian Islands**, **New Zealand**, **and Easter Island**.
- Polynesia includes **Tuvalu** (an island group outside the triangle), along with smaller enclaves in the **Solomon Islands** and **Vanuatu**.
- **New Zealand**, **Samoa**, **Tonga**, **Tuvalu**, **Vanuatu**, and **the Solomon Islands** are the independent nations in the Polynesian region.

- Other territories include:
  - **American Samoa:** Unincorporated territory of the United States located to the southeast of Samoa.
  - **Cook Islands:** Self-governing state in free association with New Zealand.
  - **Easter Island:** Province and special territory of Chile.
  - **French Polynesia:** Overseas country of the French Republic.
  - **Hawaii:** In 1959, Hawaii became the 50th state of the US (**Alaska** - 49th state; purchased from Russia).

New Zealand

- **New Zealand is the largest country in Polynesia**.
- The country comprises two main islands — the **North and South islands** — and several small islands.
- Three in four New Zealanders (total population is 4.9 million) live in the **North Island**.
- The **South Island** is important for forestry (Western side of Southern Alps), agriculture, sheep rearing and dairy farming (**Marlborough**, **Canterbury Plains**).
- **Wellington is the capital**, and **Auckland is the largest urban area** - both are located on the **North Island**.

Southern Alps

- **The Southern Alps** (900-3000 m) in the **South Island** are the major mountain range in New Zealand.
- **Mount Cook (Aoraki)** is the highest peak.
- It acts as a **natural barrier that separates New Zealand's wettest and driest climates**. The western slopes (which receive the country's highest annual rainfall) are wet and forested. The rain shadow region on the eastern side has vast pasture lands and **fertile Canterbury Plains**.

7.6. Zealandia

- Zealandia is a mostly submerged **microcontinent** (made up of continental crust) in the South Pacific, spanning about half the size of Australia but with only **6-7% of its land above sea level**.
- It separated from **Antarctica** 100 million years ago and from Australia 80 million years ago (formerly part of Gondwana). The above-sea portions include New Zealand's North and South Islands, Stewart Island, smaller islets, and New Caledonia at its northern tip.
- Zealandia straddles the **Australian and Pacific tectonic plates**, making it **highly tectonically active**.
- Volcanic regions, including the **Taupo Volcanic Zone** on the North Island, showcase significant geothermal activity, with geysers and hot springs.
- The **Southern Alps** on the South Island and the North Island Volcanic Plateau are central mountain ranges formed through tectonic uplift.
- The underwater expanse of Zealandia contains rich mineral and natural gas deposits, such as the Maui field in the Tasman Sea.

7.7. Recently In The News

7.7.1. Lizard Island

- Heat stress triggered a bleaching event that devastated 97% of the coral at **Australia's Lizard Island**.
- Lizard Island, also called **Jiigurru or Dyiigurra**, is part of the **Great Barrier Reef**.
- Aboriginal Australian clan **Dingaal** (or Walmbarddha or Walmbaria) are traditional island owners.

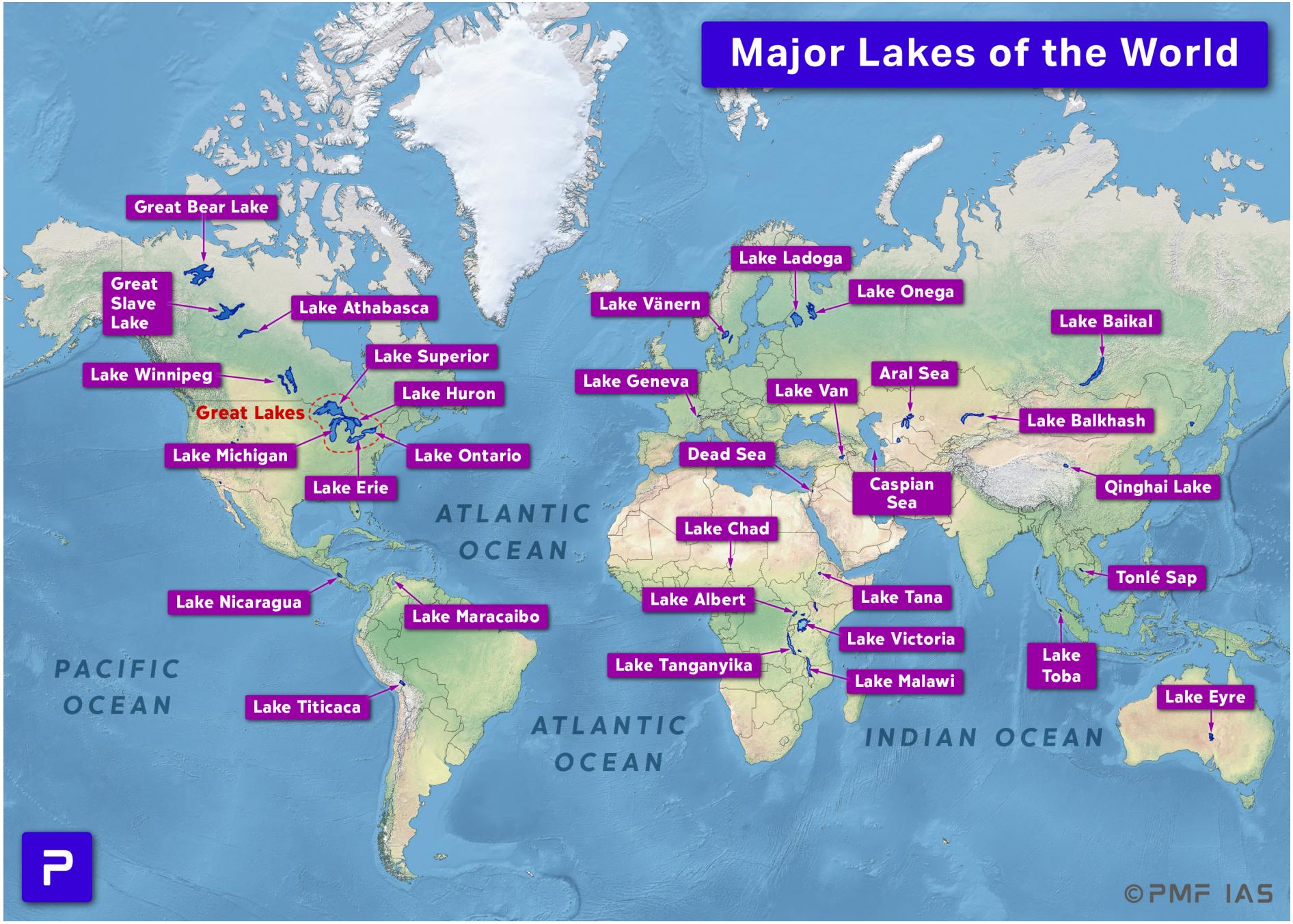
7.7.2. Rottnest Island

- Recently, a seaplane crashed near **Rottnest Island**, Australia.

About Rottnest Island

- Known as **Wadjemup** to the **Whadjuk Noongar people**, holding cultural significance.
- It is located 19 km off the coast of **Fremantle**, near **Perth**, Western Australia.
- It served as an internment camp during World War I and a defense base in World War II.
- It is popular for snorkeling, cycling, and wildlife observation, especially quokka sightings.
- **Quokka Habitat:** Home to the **Quokka** (Setonix brachyurus), a rare **marsupial** on the mainland.

---------- End of Chapter ----------


Major Lakes of the World
Great Bear Lake
Great Slave Lake
Lake Athabasca
Lake Winnipeg
Lake Superior
Lake Huron
Great Lakes
Lake Michigan
Lake Ontario
Lake Erie
Lake Nicaragua
Lake Maracaibo
Lake Titicaca
PACIFIC OCEAN
ATLANTIC OCEAN
ATLANTIC OCEAN
INDIAN OCEAN
Lake Ladoga
Lake Onega
Lake Vänern
Lake Baikal
Lake Geneva
Lake Van
Aral Sea
Lake Balkhash
Dead Sea
Caspian Sea
Qinghai Lake
Lake Chad
Tonlé Sap
Lake Albert
Lake Tana
Lake Victoria
Lake Tanganyika
Lake Malawi
Lake Toba
Lake Eyre
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Major Lakes of the World
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Lake Maracaibo
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ATLANTIC OCEAN
ATLANTIC OCEAN
Lake Ladoga
Lake Onega
Lake Vänern
Lake Geneva
Lake Van
Aral Sea
Lake Baikal
Lake Balkhash
Dead Sea
Caspian Sea
Qinghai Lake
Lake Chad
Tonlé Sap
Lake Albert
Lake Tana
Lake Victoria
Lake Tanganyika
Lake Malawi
Lake Toba
Lake Eyre
INDIAN OCEAN
©PMF IAS

8. Major Lakes on Earth

- ***Note 1:*** *The* ***Black Sea is not a lake*** *since the* ***Bosporus*** *and* ***Dardanelles Straits*** *connect it to the Mediterranean Sea. Many big rivers fall into the Black Sea, making the salinity of its surface water half that of the ocean — 17 to 18 parts per thousand.*
- ***Note 2:*** *The* ***Caspian*** *Sea and the* ***Dead Sea*** *are* ***lakes****. The surface and shores of the* ***Dead Sea*** *are* ***423 metres below sea level****, making it* ***Earth's lowest elevation on land****.*
- ***Note 3:*** *While mentioning the facts about lakes, we generally ignore the Caspian Sea, as it is too big to be considered a lake. But it is still a lake (a closed body).*

8.1. World's Highest and Lowest Lakes

- The world's highest lake, if size is not a criterion, maybe the **crater lake of Ojos del Salado**, at 6,390 metres (also the **world's highest active volcano**). It is in the Andes.
- The **highest large lake** in the world is the **Pumoyong Tso** (**Pumoyong Tso**; 5018 meters above sea level) in the Tibet Autonomous Region of China.
- The **world's highest commercially navigable lake** is **Lake Titicaca** in Peru and Bolivia, at 3,810 m. It is also the **largest lake in South America**.
- The lowest lake in the world is the **Dead Sea**. Located in the **Jordan Valley** between **Israel** and **Jordan**, its surface is approximately **420 meters** below sea level.

8.2. The Largest Lakes

8.2.1. The Largest Lakes by Surface Area

1. **Caspian Sea (saline lake) — Asia**
2. **Lake Superior (freshwater lake) — North America**
3. **Lake Victoria (freshwater lake) — Africa**
4. **Lake Huron (freshwater lake) — North America**
5. **Lake Michigan (freshwater lake) — North America**

8.2.2. The Largest Lakes by Continent Based on Surface Area

1. **Australia: Lake Eyre** (Salt Lake)
2. **Africa: Lake Victoria**, also the second-largest freshwater lake on Earth. It is one of the Great Lakes of Africa.
3. **Antarctica: Lake Vostok** (subglacial)
4. **Asia: Lake Baikal** (if the Caspian Sea is considered a lake, it is the largest in the world; however, it is divided between the two geographic continents)
5. **Europe: Lake Ladoga**, followed by Lake Onega, both located in northwestern Russia.

6. **<u>North America:</u> Lake Superior**.
7. **<u>South America:</u> Lake Titicaca**, which is also the highest navigable body of water on Earth at 3,812 metres above sea level. It is located in the **Andes mountains** on the border between **Peru** and **Bolivia**. The much larger **Lake Maracaibo** is a contiguous body of water with the sea, so it is ignored.

8.2.3. Largest Lakes by Volume

1. **Caspian Sea (saline lake)**
2. **Lake Baikal (freshwater lake)**
3. **Lake Tanganyika (freshwater lake)**
4. **Lake Superior (freshwater lake)**

8.2.4. Deepest Lakes in the World

1. **Lake Baikal**
2. **Lake Tanganyika**
3. **Caspian Sea**

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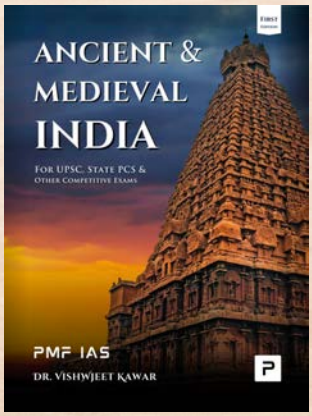

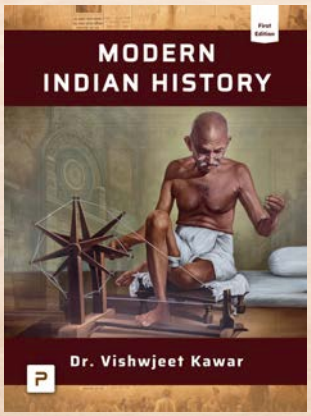

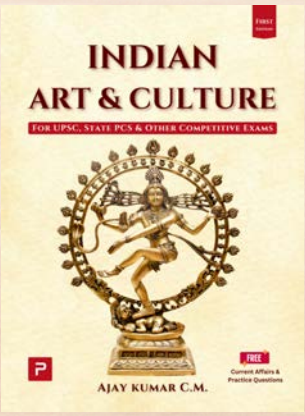

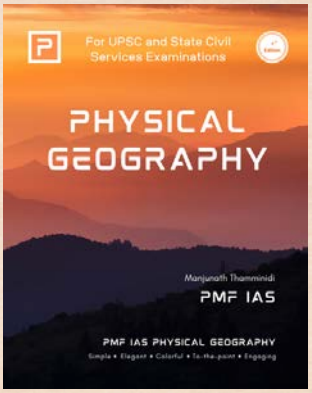

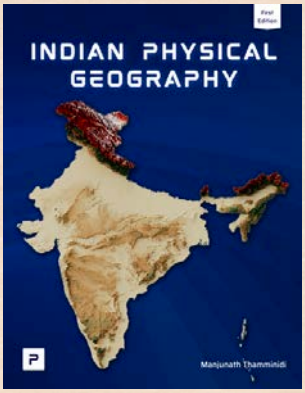

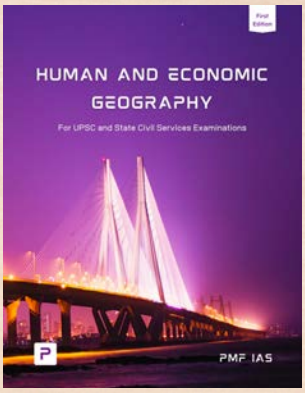

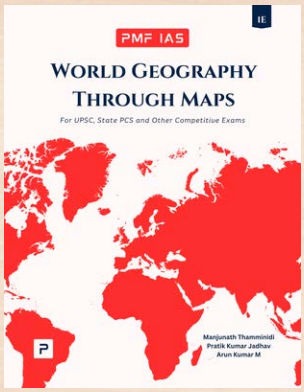

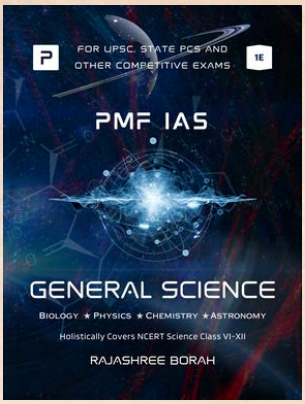

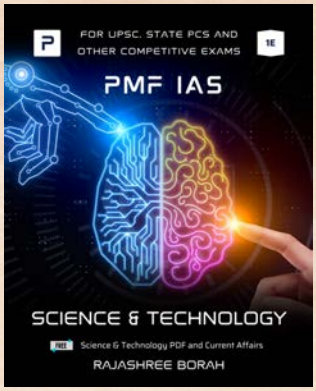

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